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*The Trusted Integrator for Sustainable Solutions*

REMOVAL SUPPORT TEAM 3  
EPA CONTRACT EP-S2-14-01

December 12, 2014

Mr. Angel Rodriguez, On-Scene Coordinator  
U.S. Environmental Protection Agency  
Response and Remediation Branch  
Caribbean Environmental Protection Division, Region II  
1492 Ponce De León Ave., Suite 417,  
San Juan, PR 00907-4127

**EPA CONTRACT NO: EP-S2-14-01**

**TDD NO: TO-0001-0005**

**DOCUMENT CONTROL NO: RST3-01-F-0063**

**SUBJECT: FINAL SITE-SPECIFIC HEALTH AND SAFETY PLAN, REVISION 2 -  
PUERTO RICO OLEFINS ASBESTOS SITE, PENUELAS, PUERTO RICO**

Dear Mr. Rodriguez,

Enclosed please find the RST 3 Final Site-Specific Health and Safety Plan (HASP), Revision 2 for the Puerto Rico Olefins Asbestos Site located in Peñuelas, Puerto Rico. This Final Site-Specific HASP, Revision 2 covers soil, bulk asbestos, wipe, air, and micro-vac sampling activities to be conducted at the Site which began in July 2014. This Final Site-Specific HASP, Revision 2 was revised to update the Site history and Weston Solutions, Inc. FLDs. If you have any questions or comments, please do not hesitate to contact me at (787) 354-2489.

Sincerely,  
Weston Solutions, Inc.

Carlos Huertas  
RST 3 Site Project Manager

Enclosure

cc: TDD File No.: TO-0001-0005

*an employee-owned company*

In association with Scientific and Environmental Associates, Inc.,  
Environmental Compliance Consultants, Inc., Avatar Environmental, LLC,  
On-Site Environmental, Inc., and Sovereign Consulting, Inc.



**REGION II RST 3 HEALTH AND SAFETY PLAN**  
**EMERGENCY RESPONSE/REMOVAL ASSESSMENT/REMOVAL ACTION**  
**(Revised 16 March 2011)**

TDD No. TO-0001-0005

Site Name: Puerto Rico Olefins Asbestos

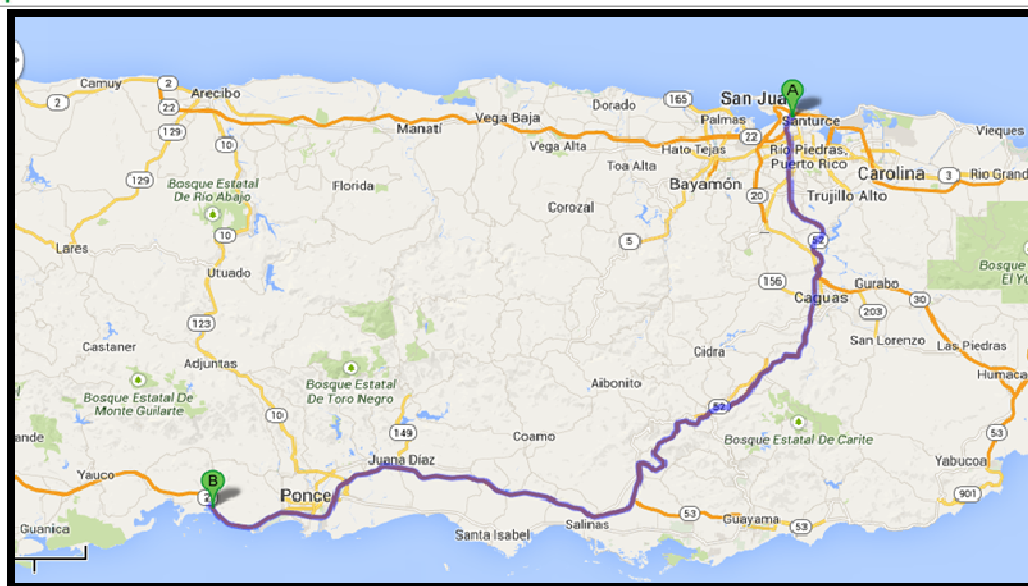
Site Address: Coordinates: 18.002549° N / -66.722549° W

City: Peñuelas

State: Puerto Rico

**Directions to Site:**

- A** Calle Dr Manuel Fernandez Pavia, San Juan, 00909, Puerto Rico
- |  |                           |
|--|---------------------------|
| 1. Head <b>northeast</b> on <b>Calle Europa</b> toward <b>Avenida Manuel Fernández Juncos</b><br>About 50 secs | go 290 m<br>total 290 m   |
| 2. Turn left onto <b>Avenida Juan Ponce de León</b>  | go 150 m<br>total 450 m   |
| 3. Turn left to merge onto <b>Expreso José De Diego/Puerto Rico 22</b><br>About 1 min                          | go 1.6 km<br>total 2.1 km |
| 4. Take the exit on the left onto <b>PR-18</b><br>About 5 mins   | go 6.6 km<br>total 8.7 km |
| 5. Continue onto <b>Autopista Luis A. Ferré/PR-52</b><br><b>Partial toll road</b><br>About 1 hour 5 mins       | go 109 km<br>total 117 km |
| 6. Continue onto <b>PR-2</b><br>About 6 mins   | go 9.9 km<br>total 127 km |
| 7. Take the exit   | go 210 m<br>total 128 km  |
| 8. Turn right toward <b>PR-127</b><br>About 56 secs  | go 260 m<br>total 128 km  |
| 9. Sharp left onto <b>PR-127</b><br>About 54 secs  | go 300 m<br>total 128 km  |
- B** PR-127



*\*\*This map is subject to Google's Terms of Service, and Yahoo is the owner of rights therein.*

## **Historical/Current Site Information:**

The Puerto Rico Olefins Asbestos Site (the Site) is located at Road 127, KM 13.2, Tallaboa, Poniente Peñuelas, Puerto Rico. During a visual inspection, the U.S. Environmental Protection Agency (EPA) identified fugitive dust clouds migrating out of the facility during demolition activities conducted by HOMECA Inc. Beginning in 2010 and continuing until the present, an asbestos abatement occurred at the Site. Improper asbestos abatement techniques may have been used at the Site resulting in potential asbestos contamination throughout the Site and in residential neighborhoods downwind of the Site.

On November 21, 2013, as part of Phase I of the Removal Assessment, the EPA On-Scene Coordinator (OSC), EPA Air Program representative, and Weston Solutions, Inc., Removal Support Team 2 (RST 2) [currently the Removal Support Team 3 (RST 3)] mobilized to the Site to perform multi-media sampling. As directed by the EPA OSC, RST 2 collected five bulk samples, including one field duplicate, four soil samples, including one field duplicate, and 10 wipe samples, including one wipe blank. Bulk samples were collected and submitted for asbestos analysis via EPA 600/R-93/116 Method using Polarized Light Microscopy (PLM). Soil samples were collected and submitted for asbestos analysis via modified EPA 600/R-93/116 Method using Transmission Electron Microscopy (TEM) with California Air Resource Board (CARB) 435 prep. Wipe samples were collected and submitted for asbestos analysis via American Society for Testing Materials (ASTM) 6480-05 Method. Samples were collected from outside areas where suspected asbestos contamination may have occurred and inside areas where asbestos may have entered the building.

On December 13, 2013, as part of Phase I of the Removal Assessment, the EPA OSC and RST 2 remobilized to the Site to collect two additional bulk samples. The additional bulk samples were collected from two specific locations as directed by the EPA OSC. The two bulk samples were collected and submitted for asbestos analysis via EPA 600/R-93/116 Method using PLM. Samples were collected from outside areas where suspected asbestos contamination may have occurred.

Based on the validated analytical results of the samples collected as part of Phase I of the Removal Assessment, asbestos was detected in bulk samples ranging from non-detect to 40 percent (%) amosite and 20% chrysotile, in soil samples ranging from 3 amosite/chrysotile asbestos structures to 9 amosite/chrysotile asbestos structures, and in wipe samples ranging from 7,760 structures per square centimeter (str/cm<sup>2</sup>) to 374,000 str/cm<sup>2</sup>. The two additional bulk samples collected on December 13, 2013 were both non-detect for asbestos. The wipe blank sample was non-detect for asbestos.

On December 4 and 5, 2013, as part of Phase II of the Removal Assessment, the EPA OSC and RST 2 mobilized to the Jorge Lucas Perez Valdivieso School, located approximately 0.25 miles south of the Site, to conduct air sampling activities within classrooms identified by the EPA OSC. The school is separated into two areas referred to by RST 2 as Area 1 and Area 2. The two separate areas are separated by a road way. As directed by the EPA OSC, RST 2 established three air sampling stations within eight of the schools classrooms (CR01 through CR08). Air samples were collected from each of the established air sampling stations within each classroom but per the request of the EPA OSC only one of the air samples from each of the classrooms was submitted for asbestos analysis. .

On December 5, 2013, as part of Phase II of the Removal Assessment, RST 2 shipped 11 air samples, including two lot blanks and one field blank, to the EMSL Analytical, Inc. laboratory

for asbestos analysis via Method ISO 10312 - International Standard for the Determination of Asbestos Fibers - Direct Transfer. Per the request of the EPA OSC, on December 13, 2013, RST 2 shipped the additional two air samples collected on December 4, 2013 from classroom CR01 to the EMSL Analytical, Inc. laboratory for asbestos analysis via Method ISO 10312 - International Standard for the Determination of Asbestos Fibers - Direct Transfer.

Based on the validated analytical results of the samples collected as part of Phase II of the Removal Assessment, chrysotile asbestos was detected in eight of the 10 field air samples submitted for asbestos analysis. The total number of asbestos structures in the positive detections ranged between 2 and 25. The reported concentrations in the positive detections ranged between 0.0004 structures per cubic centimeter (s/cc) and 0.0032 s/cc.

On December 12 and 13, 2013, as part of Phase IIIA of the Removal Assessment, the EPA OSC and RST 2 mobilized to the Jorge Lucas Perez Valdivieso School to perform wipe sampling within the classrooms of the school. The areas identified in each classroom to be sampled were the entrance, near a window, and the dustiest area in the room. A total of 90 wipe samples, including five field blanks and one lot blank, were collected from 28 classrooms (CR01 through CR29, excluding CR27). Classroom CR27 and some other general areas of the school were not sampled due to the fact that the areas were not accessible or as directed by the EPA OSC. Wipe samples were collected and submitted for asbestos analysis via ASTM 6480-05 Method.

Based on the validated analytical results of the samples collected as part of Phase IIIA of the Removal Assessment, asbestos was detected in wipe samples ranging from non-detect to 363,000 str/cm<sup>2</sup>. The wipe blank samples were non-detect for asbestos.

On December 17 through 19, 2013, as part of Phase IIIB of the Removal Assessment, the EPA OSC and RST 2 mobilized to the Tallaboa Encarnacion Community to perform wipe sampling on the exterior of several properties. As directed by the EPA OSC, the area identified to be sampled had to be exposed to ambient air, but not exposed to rain or had not been cleaned recently. A total of 27 wipe samples, including two field blanks, were collected from 24 properties (P0005 through P0028). Wipe samples were collected and submitted for asbestos analysis via ASTM 6480-05 Method.

Based on the validated analytical results of the samples collected as part of Phase IIIB of the Removal Assessment, asbestos was detected in wipe samples from non-detect to 32,200,000 str/cm<sup>2</sup>. The wipe blank samples were non-detect for asbestos.

On January 2 and 3, 2014, as part of Phase IIIC of the Removal Assessment, the EPA OSC, RST 2, and the Puerto Rico Environmental Quality Board (EQB) mobilized to background locations, selected by the EPA OSC, at different distances and directions from the Site. As directed by the EPA OSC, the area identified to be sampled had to be exposed to ambient air, but not exposed to rain or have not been cleaned recently. A total of 13 wipe samples, including one field blank, were collected from 12 properties (P0029 through P0040). Properties P0029 through P0032 were located over five miles northwest of the Site; properties P0033 through P0036 were located over one mile north of the Site; and properties P0037 through P0040 were located over two miles southeast of the Site. Wipe samples were collected and submitted for asbestos analysis via ASTM 6480-05 Method.

Based on the validated analytical results of the samples collected as part of Phase IIIC of the Removal Assessment, asbestos was detected in wipe samples ranging from non-detect to 160,000 str/cm<sup>2</sup>. The wipe blank sample was non-detect for asbestos.

On January 9, 2014, as part of Phase IIID of the Removal Assessment, the EPA OSC and RST 2 mobilized to the Head Start Encarnacion School (property P0014) to perform wipe sampling activities within the school. As directed by the EPA OSC, RST 2 collected five wipe samples from inside the classroom. The areas identified in each classroom to be sampled were the entrance, near a window, the dustiest area in the room, and two other high use areas. A total of five wipe samples were collected from property P0014. Wipe samples were collected and submitted for asbestos analysis via ASTM 6480-05 Method.

Based on the validated analytical results of the samples collected as part of Phase IIID of the Removal Assessment, asbestos was detected in wipe samples ranging from 2,910 str/cm<sup>2</sup> to 41,700 str/cm<sup>2</sup>.

From March 4 through 27, 2014, as part of Phase IV of the Removal Assessment, the EPA OSC and RST 2 mobilized to the Tallaboa Encarnación area in Peñuelas, Puerto Rico to perform indoor air and micro vac sampling activities at 32 residential/commercial properties (property P0008 is considered two separate properties) located within 0.25 miles of the Site. Air samples were submitted for asbestos analysis via phase contrast microscopy (PCM) Method [National Institute for Occupational Safety and Health (NIOSH) 7400] and TEM Method (NIOSH 7402), and/or ISO Method 13794:199(E). Micro vac samples were submitted for asbestos analysis via ASTM Method D-5755-09.

Based on the validated PCM analytical results of the air samples collected as part of Phase IV of the Removal Assessment, asbestos was detected in each property sampled at concentrations ranging from <0.001 fibers per cubic centimeter (F/cc) to 0.02 F/cc. Six properties sampled were not able to be run for PCM analysis due to the cassettes being overloaded with particulates.

Based on the validated TEM analytical results of the air samples collected as part of Phase IV of the Removal Assessment, chrysotile, anthophyllite, actinolite, or tremolite asbestos fibers were detected in 16 of the 32 properties sampled. The reported concentrations in the positive detections ranged between 0.00018 s/cc to 0.5299 s/cc. In addition, six properties (including the separated property P0008) contained asbestos concentrations which exceeded the Site-Specific Action Levels of 0.0009 s/cc for residential properties and 0.002 s/cc for commercial properties.

Based on the validated TEM analytical results of the micro vac samples collected as part of Phase IV of the Removal Assessment, chrysotile, actinolite, or amosite asbestos fibers were detected in 26 of the 32 properties sampled. The reported concentrations in the positive detections ranged between 231.3 s/cm<sup>2</sup> to 12,782,000.0 s/cm<sup>2</sup>. In addition, 13 properties (including the separated property P0008) contained asbestos concentrations which exceeded the Site-Specific Action Levels of 5,000 s/cm<sup>2</sup>.

In April 2014, the potentially responsible party (PRP) initiated Removal Actions at the Jorge Lucas Perez Valdivieso School and the Head Start Encarnacion School. The Removal Actions were completed in August 2014.

From September 30, 2014 through October 23, 2014, RST 3 mobilized to the Site (property P0001) to provide maintenance to the DUSTTRAK™ units installed on the Site. Personal air samples were collected to determine personal exposure within the Contamination Reduction Zone (CRZ) where the DUSTTRAK™ units are installed. A total of 12 personal air samples, including three field blanks and one lot blank, were collected and submitted for asbestos analysis by NIOSH Method 7400 (PCM) and Method 7402 (TEM).

Based on the asbestos PCM validated analytical results of the samples collected as part of personal air monitoring sampling event, asbestos was detected in two of the eight field samples at a concentration of 0.006 f/cc; however, asbestos was not detected and any of the samples at concentrations exceeding the Site-Specific Action level of 0.1 f/cc. Based on the asbestos TEM validated analytical results, all samples were non-detect for asbestos.

### **RST 3 Scope of Work:**

The Removal Action of the Puerto Rico Olefins Asbestos Site (the Site) began on April 28, 2014. To confirm cleanup of the Jorge Lucas Valdivieso School, RST 3 has been tasked with conducting PRP removal oversight and the collection of clearance wipe samples from classrooms selected by the EPA OSC. RST 3 will collect up to three wipe samples per classroom. Based upon the analytical results, EPA will determine if the classroom is considered clean. RST 3 will also collected air, micro-vac, soil, bulk and wipe samples from six properties identified as impacted within the Tallaboa Encarnacion community. These samples will identify construction materials containing asbestos. Furthermore, RST 3 will continue to conduct air monitoring utilizing DustTrak 8530 units with telemetry to monitor particulates from the Site. RST 3 will collect additional multi-media samples for asbestos analysis, as needed and as directed by the EPA OSC.

### **Four (4) S.M.A.R.T. Health and Safety Goals for the Project (Simple, Measurable, Actionable, Reasonable, & Timely):**

1. Conduct safety orientation to personnel involved in the removal.
2. Due to high temperatures, keep personnel well hydrated.
3. Awareness of surrounding areas and walking surfaces, minimizing slips, trips, and falls.
4. Safe soil/bulk/wipe/air/micro-vac sampling practices, utilizing proper PPE.

### **Incident Type:**

- ☐ Emergency Response
- ☐ Removal Assessment
- ☒ Removal Action: July 1, 2014
- ☐ Residential Sampling/Investigation
- ☒ PRP Oversight: July 1, 2014
- ☐ Other

### **Location Class:**

- ☒ Industrial
- ☒ Commercial
- ☒ Urban/Residential
- ☐ Rural

U.S. EPA OSC: Angel Rodriguez  
Original HASP: Yes or No: Yes  
Lead RST 3: Carlos Huertas

Date of Initial Site Activities: 7/1/2014  
Site Health & Safety Coordinator: Carlos Huertas  
Site Health & Safety Alternate: Not Applicable

**Response Activities/Dates of Response** (fill in as applicable)

**Emergency Response:**

- ☒ Perimeter Recon - Beginning November 21, 2013
- ☒ Site Entry - Beginning November 21, 2013
- ☒ Visual Documentation - Beginning November 21, 2013
- ☒ Multi-Media Sampling - Beginning November 21, 2013
- ☒ Decontamination - Beginning November 21, 2013

**Removal Assessment:**

- ☒ Perimeter Recon - Beginning December 2013
- ☒ Site Entry - Beginning December 2013
- ☒ Visual Documentation - Beginning December 2013
- ☒ Multi-Media Sampling - Beginning December 2013
- ☒ Decontamination - Beginning December 2013

**Removal Action:**

- ☒ Perimeter Recon - Beginning July 1, 2014
- ☒ Site Entry - Beginning July 1, 2014
- ☒ Visual Documentation - Beginning July 1, 2014
- ☒ Multi-Media Sampling - Beginning July 1, 2014
- ☒ Decontamination - Beginning July 1, 2014

**Physical Safety Hazards to Personnel:**

- |   |  |   |
|---|--|---|
| <input checked="" type="checkbox"/> Inclement Weather – Attach FLD02    | <input checked="" type="checkbox"/> Heat – Attach FLD05            | <input type="checkbox"/> Cold – Attach FLD06                      |
| <input type="checkbox"/> Confined Space – Attach FLD08                  | <input type="checkbox"/> Industrial Trucks – Attach FLD09          | <input type="checkbox"/> Manual Lifting – Attach FLD10            |
| <input checked="" type="checkbox"/> Terrain – Attach FLD11              | <input type="checkbox"/> Structural Integrity – Attach FLD13       | <input type="checkbox"/> Site Security – Attach FLD14             |
| <input type="checkbox"/> Pressurized Containers, Systems – Attach FLD16 | <input type="checkbox"/> Use of Boats – Attach FLD18               | <input type="checkbox"/> Waterways – Attach FLD19                 |
| <input type="checkbox"/> Explosives – Attach FLD21                      | <input checked="" type="checkbox"/> Heavy Equipment – Attach FLD22 | <input type="checkbox"/> Aerial Lifts and Manlifts – Attach FLD24 |

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Elevated Surfaces and Fall Protection – Attach FLD25 | <input type="checkbox"/> Ladders – Attach FLD26                       | <input type="checkbox"/> Excavations/Trenching – Attach FLD28          |
| <input type="checkbox"/> Fire Prevention – Attach FLD31                       | <input type="checkbox"/> Demolition – Attach FLD33                    | <input type="checkbox"/> Underground/Overhead Utilities – Attach FLD34 |
| <input type="checkbox"/> Hand and Power Tools – Attach FLD38                  | <input checked="" type="checkbox"/> Illumination – Attach FLD39       | <input type="checkbox"/> Storage Tanks – Attach FLD40                  |
| <input type="checkbox"/> Lead Exposure – Attach FLD46                         | <input type="checkbox"/> Sample Storage – Attach FLD49                | <input type="checkbox"/> Cadmium Exposure – Attach FLD50               |
| <input checked="" type="checkbox"/> Asbestos Exposure – Attach FLD52          | <input type="checkbox"/> Hexavalent Chromium Exposure – Attach FLD 53 | <input type="checkbox"/> Benzene Exposure – Attach FLD 54              |
| <input type="checkbox"/> Drilling Safety – Attach FLD56                       | <input type="checkbox"/> Drum Handling – Attach FLD58                 | <input type="checkbox"/> Gasoline Contaminant Exposure – Attach FLD61  |
| <input type="checkbox"/> Noise – Attach CECHSP, Section 7                     | <input checked="" type="checkbox"/> Walking/Working Surfaces          | <input type="checkbox"/> Oxygen Deficiency                             |
| <input type="checkbox"/> Unknowns in Tanks or Drums                           | <input type="checkbox"/> Nonionizing Radiation                        | <input type="checkbox"/> Ionizing Radiation                            |

### Biological Hazards to Personnel:

- |   |  |
|---|--|
| <input type="checkbox"/> Infectious/Medical/Hospital Waste – Attach FLD 44 and 45 | <input checked="" type="checkbox"/> Non-domesticated Animals – Attach RST 3 FLD43A     |
| <input checked="" type="checkbox"/> Insects – Attach RST 3 FLD 43B                | <input checked="" type="checkbox"/> Poisonous Plants/Vegetation – Attach RST 3 FLD 43D |
| <input type="checkbox"/> Raw Sewage   | <input type="checkbox"/> Bloodborne Pathogens – Attach FLD 44 and 45                   |

**Disclaimer:** The Field Operation Procedures (FLDs) provide general information of the hazards associated with each physical safety hazards that could be encountered within EPA, Region II. All of the information or procedures referenced in the FLDs may not necessarily apply to the site or local conditions.

### Training Requirements:

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> 40-Hour HAZWOPER Training with three days supervised experience | <input type="checkbox"/> 8-Hour Management or Supervisor Training in addition to basic training course |
| <input checked="" type="checkbox"/> 8-Hour Annual Refresher Health and Safety Training              | <input type="checkbox"/> Site Specific Health and Safety Training                                      |
| <input type="checkbox"/> DOT (CMV Training - ERV in Use)  | <input type="checkbox"/> Bio-Medical Collection and Response   |



## Medical Surveillance Requirements:

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Baseline initial physical examination with physician certification | <input checked="" type="checkbox"/> Annual medical examination with physician certification |
| <input type="checkbox"/> Site-specific medical monitoring protocol (Radiation, Heavy Metals)           | <input type="checkbox"/> Asbestos worker medical protocol                                   |

## Vehicle Use Assessment and Selection:

Driving is one of the most hazardous and frequent activities for Weston Employees. As such, Weston Employees are required to adhere to established safe operating practices in order to maintain their eligibility to drive Weston owned, leased, or rented vehicles. Every person riding in a Weston vehicle, including passengers must maintain a commitment for a safe journey. This means being attentive while in the vehicle and helping the driver to notice hazards ahead of and around the vehicle and ensure that their presence does not distract the driver from safely operating the vehicle.

A high percentage of vehicle accidents occur when operating in reverse. Anytime a vehicle is operated in reverse, e.g., backing out of a parking area, if there are passengers, at least one of them are to assist the driver by acting as a guide person during the reverse movement or during other vehicle operation where it would be prudent to have a guide person(s) participate in the vehicle movement. When practical, the preferred parking method would be to back into the parking area.

At a minimum, each Weston Driver must:

- Possess a current, valid drivers' license
- Current Commercial Motor Vehicle (CMV) card when operating the Emergency Response Vehicle
- Obey posted speed limits and traffic laws
- Wear seat belts at all times while the vehicle is in operation
- Conduct a 360 degree inspection around the vehicle before attempting to drive the vehicle
- Report accidents / incidents immediately and complete a Notice of Incident (NOI)
- Keep vehicles on approved roadways (4WD doesn't guarantee mobility on unapproved surfaces)

All Region II RST 3 personnel are experienced and qualified to drive RST 3 fleet vehicles (Tahoe, Suburbans, Minivan/Cargo Van, and Emergency Response Vehicle). However, in the event that vehicle rental is required, each person must take the time to familiarize themselves with that particular vehicle. This familiarization includes adjustment of the dashboard knobs/controls, mirrors, steering wheel, seats, and a 360 degree external inspection of the vehicle.

1. The following vehicles are anticipated to be used on this project:

- |  |   |
|--|---|
| <input type="checkbox"/> Car   | <input type="checkbox"/> Pickup Truck   |
| <input checked="" type="checkbox"/> Intermediate/Standard SUV<br>(e.g. Chevy Trailblazer, Chevy Tahoe, Ford Explorer, Ford Escape) | <input checked="" type="checkbox"/> Full Size SUV (e.g. Chevy Suburban, Ford Expedition, GMC Yukon) |
| <input type="checkbox"/> Minivan/Cargo Van (e.g. Chevy Uplander, Chevy Express Van)  | <input type="checkbox"/> Box Truck (Size:_____)   |
| <input type="checkbox"/> Emergency Response Vehicle (ERV)  | <input type="checkbox"/> Other_____   |

2. Are there any on-site considerations that should be noted?

- |  |   |   |  |
|--|---|---|--|
| <input checked="" type="checkbox"/> Working/Driving Surfaces | <input checked="" type="checkbox"/> Debris                  | <input type="checkbox"/> Overhead Clearance   | <input checked="" type="checkbox"/> Obstructions |
| <input checked="" type="checkbox"/> Tire Puncture Hazards    | <input checked="" type="checkbox"/> Vegetation              | <input checked="" type="checkbox"/> Terrain   | <input type="checkbox"/> Parking                 |
| <input type="checkbox"/> Congestion                          | <input checked="" type="checkbox"/> Site Entry/Exit Hazards | <input type="checkbox"/> Local Traffic Volume | <input type="checkbox"/> Security                |
| <input type="checkbox"/> Heavy Equipment                     | <input type="checkbox"/> Time/Length of Work Day            | <input type="checkbox"/> Other:               |  |

Do any of the considerations above require further explanation? No

3. Was the WESTON Environmental Risk Management Tool completed in EHS? Yes

Was an Environmental Compliance Plan required? No

4. Are there any seasonal considerations that should be noted (e.g., Anticipated Snowy Conditions): No

5. Is a Traffic Control Plan required? No

Physical Parameters	<u>Chemical Contaminant</u>  Asbestos
Exposure Limits IDLH Level	_____ ppm <u>0.1f/cc</u> PEL _____ ppm _____ mg/m <sup>3</sup> TLV _____ ppm _____ mg/m <sup>3</sup> IDLH
Physical Form (Solid/Liquid/Gas) Color	<u>X</u> Solid _____ Liquid _____ Gas  <u>White or greenish blue or gray-green fibrous solid</u> Color
Odor	Odorless
Flash Point Flammable Limits	NA _____ Degrees F or C NA _____ % UEL NA _____ % LEL
Vapor Pressure	NA _____ mm/Hg
Vapor Density	NA _____ Air = 1
Specific Gravity	NA _____ Water = 1
Solubility	Insoluble
Incompatible Material	Varies
Routes of Exposure	<u>X</u> Inh _____ Abs <u>X</u> Con <u>X</u> Ing
Symptoms of Acute Exposure	Asbestosis, restricted pulmonary function, finger clubbing, irritating to eyes, Mesothelioma
First Aid Treatment	Irrigate eyes immediately for 15 minutes, remove to fresh air, seek medical attention immediately
Ionization Potential	NA _____ eV
Instruments for Detection	_____ PID w/ _____ Probe _____ FID _____ CGI _____ RAD Det Tube _____ pH Other <u>0.45 um MCEF, NIOSH 7400</u>

**Control Measures:** For Work Conducted at the on-site facility.



The appropriate work zones for residential or commercial properties will be determined on-site based on the proposed sampling area.

#### **Work Zone Definitions:**

Exclusion Zone (EZ) (Red Highlight) - the area where contamination is either known or expected to occur and the greatest potential for exposure exists. The outer boundary of the Exclusion Zone, called the Hotline, separates the area of contamination from the rest of the Site.

Contamination Reduction Zone (CRZ) (Yellow Highlight) - the area in which decontamination procedures take place. The purpose of the CRZ is to reduce the possibility that the Support Zone will become contaminated or affected by the Site hazards.

Support Zone (SZ) (Green Highlight) - the uncontaminated area where workers are unlikely to be exposed to hazardous substances or dangerous conditions. The Support Zone is the appropriate location for the command post, medical station, equipment and supply center, field laboratory, and any other administrative or support functions that are necessary to keep site operations running efficiently.

#### **Communications:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Buddy System  | <input type="checkbox"/> Radio                                  |
| <input type="checkbox"/> Air Horn for Emergencies | <input checked="" type="checkbox"/> Hand Signals/Visual Contact |

**Personnel Decontamination Procedures:**

- ☐ Wet Decontamination (procedures as follows)
- ☒ Dry Decontamination (procedures as follows)

PPE will be void of gross contamination, double bagged and disposed of off-site in accordance with state and local regulations.

**Equipment Decontamination Procedures:**

- ☒ None
- ☐ Wet Decontamination (procedures as follows)
- ☐ Dry Decontamination (procedures as follows)

All disposable sampling equipment will be void of gross contamination, double bagged, and disposed of off-site in accordance with state and local regulations.

Adequacy of decontamination determined by: Carlos Huertas

**Personal Protective Equipment**

TASK TO BE PERFORMED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE / OUTER GLOVE / BOOT COVER	APR CARTRIDGE TYPE or SCBA
Soil/Bulk/Wipe/Air/ Micro-vac Sampling	Level C	Tyvek	Puncture- resistant glove/Nitrile gloves/Latex boot covers	P-100
Documentation, Oversight, and Air Monitoring*	Level D	Coverall	Nitrile Gloves/Latex boot covers	None

\*It was determined that personal air samples will be collected to determine exposure while working within the CRZ while providing periodic maintenance to the DUSTTRAK™ installed on site. Personal Protective Equipment will be upgraded to Level C if sample results are above the OSHA PEL of 0.1 f/cc.

### Hazard Task Analysis

<b>RISK LEVEL (High, Medium, Low)</b>	<b>TASK/HAZARD</b>	<b>RECOGNITION/ SYMPTOMS</b>	<b>MITIGATION</b>	<b>LEVEL OF PROTECTION</b>
High	Soil, Bulk, Wipe, Air, and Micro-vac Sampling/Asbestos Exposure	Aware of areas where suspected asbestos contamination has occurred	Utilize appropriate PPE and provide personal air sampling	Level C
Medium	Reconnaissance and Sampling/Slips, Trips, and Falls	Uneven or wet terrain, poor illumination	Use caution when walking, walk in well lighted areas	Level C

#### Frequency and Types of Air Monitoring:

☒ Continuous
 ☒ Routine – Air Sampling
 ☐ Periodic - \_\_\_\_\_

<b>DIRECT READING INSTRUMENTS</b>	<b>GilAir Plus</b>	<b>DUSTTRAK™ 8530</b>
<b>EQUIPMENT ID NUMBER</b>	Various	Various
<b>CALIBRATION DATE</b>	Daily	Monthly
<b>RST 3 PERSONNEL</b>	Carlos Huertas Angel Alicea	Carlos Huertas Angel Alicea
<b>ACTION LEVEL</b>	0.1 f/cc	0.150 mg/m <sup>3</sup>

## Emergency Telephone Numbers

Emergency Contact	Location / Address	Telephone Number	Notified
<b>Hospital</b>	Hospital Damas / Ponce By pass PR#2	787-840-8686	Yes
<b>Ambulance</b>	911		No
<b>Police</b>	911		No
<b>Fire Department</b>	911		No

Chemical      Trauma      ☒ Yes      ☐ No      Capability?

If no, closest backup: \_\_\_\_\_ Phone: \_\_\_\_\_

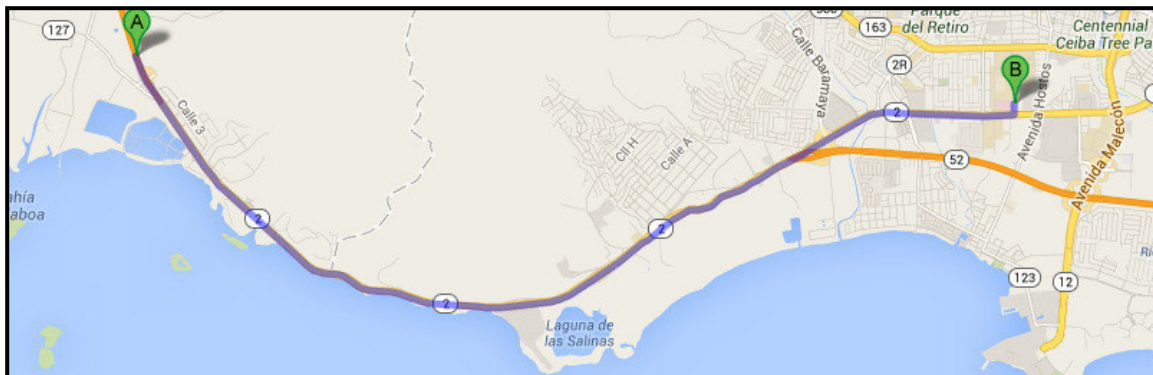
Directions to Hospital (Attach Color Map Following This Page):

### Hospital Damas, Ponce, PR

**A** PR-127

- 127** 1. Head **northwest** on **PR-127** go 240 m  
total 240 m
- ➡** 2. Turn right toward **PR-2** go 100 m  
total 350 m
- 2** 3. Turn right to merge onto **PR-2** go 9.9 km  
total 10.2 km  
About 6 mins
- 2** 4. Exit on the left to stay on **PR-2** go 3.0 km  
total 13.2 km  
About 4 mins
- ⬅** 5. Turn left onto **Calle Damas** go 25 m  
total 13.2 km
- ⬅** 6. Take the 1st left go 110 m  
total 13.3 km
- ➡** 7. Turn right go 77 m  
total 13.4 km
- ➡** 8. Turn right go 35 m  
total 13.4 km  
Destination will be on the left

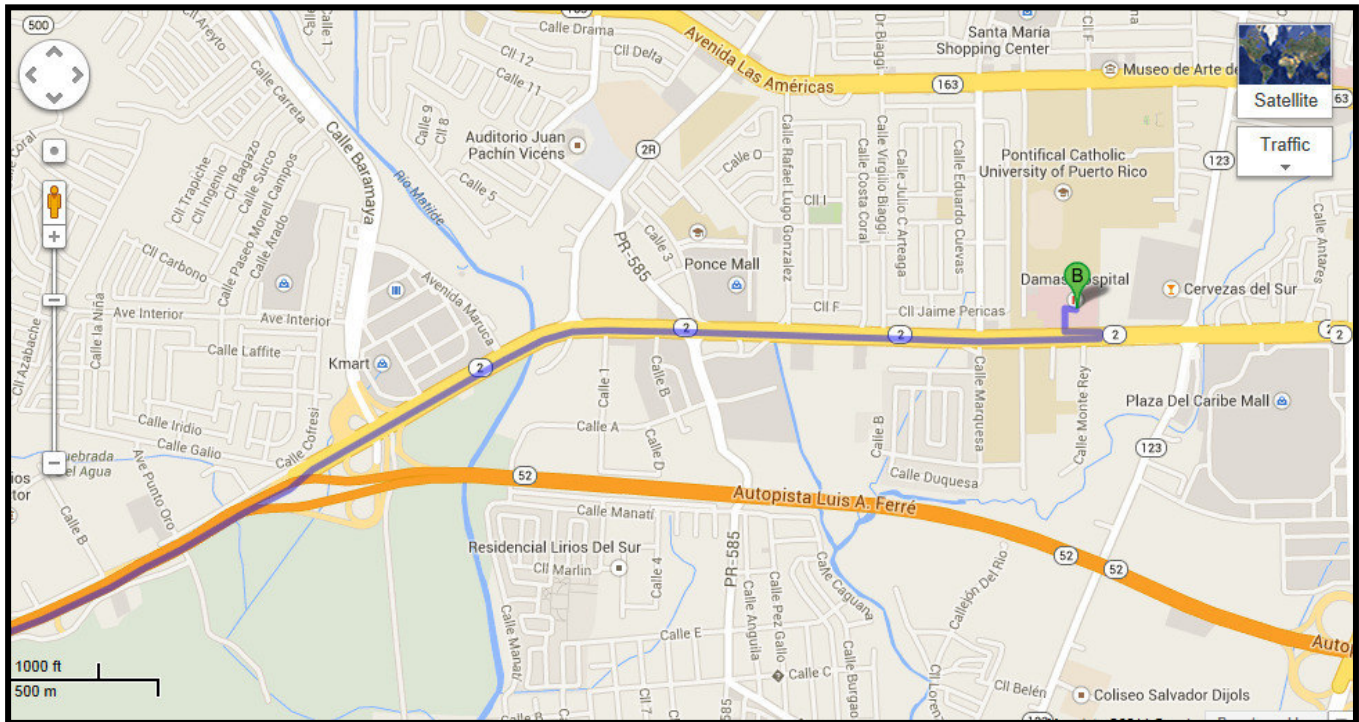
**B** **Damas Hospital**  
Ponce, 00717, Puerto Rico



*\*\*This map is subject to Google's Terms of Service, and Yahoo is the owner of rights therein.*



## Close up



*\*\*This map is subject to Google's Terms of Service, and Yahoo is the owner of rights therein.*

Route verified by: Carlos Huertas

Date: 7/1/2014



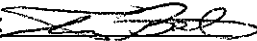
### Additional Emergency Telephone Contacts

<b>WESTON Medical Emergency Service</b> Dr. Peter Greaney, Medical Director WorkCare 300 South Harbor Blvd, Suite 600 Anaheim, California 92805	800-455-6155 Regular Business Hours (9AM to 7:30PM) <b>Dial 0 or Ext. 175 for Michelle Bui to request the on-call clinician.</b> 800-455-6155 After Hours (Weekdays 7:31PM to 8:59AM, Weekends, Holidays) <b>Dial 3 to reach the after-hours answering service. Request that the service connect you with the on-call clinician or the on-call clinician will return your call within 30 minutes.</b>
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-764-7661
<b>Chemtel</b>	800-255-3924
DOT	800-424-8802
CDC	800-232-0124

#### Pre-Response Approval

HASP prepared by: Carlos Huertas

Date: 7/1/2014

Pre-Response/Entry Approval by: 

Date: 12/12/14

Tasks Conducted	Level of Protection/Specific PPE Used
Soil/Bulk/Wipe/Air/Micro-vac Sampling	Level C
Documentation, Oversight, and Air Monitoring*	Level D

\*It was determined that personal air samples will be collected to determine exposure while working within the CRZ while providing periodic maintenance to the DUSTTRAK™ installed on site. Personal Protective Equipment will be upgraded to Level C if sample results are above the OSHA PEL of 0.1 f/cc.

### Hazardous Waste Site and Environmental Sampling Activities

Off Site: ☐ Yes ☒ No

On Site: ☒ Yes ☐ No

Describe types of samples and methods used to obtain samples:

This sampling design is based on the results of the previous sampling events conducted at the Site and information currently available and may be modified on-site in light of field-screening results and other acquired information.

**Soil Sampling:** Soil samples will be collected for asbestos analysis to determine the extent of contamination. Soil asbestos samples will be collected using dedicated disposable scoops, 4-oz and 8-oz glass jars and plastic Zip Lock bags; therefore, no equipment decontamination will be required. Soil samples will be submitted for asbestos analysis via CARB 435 TEM method. All soil samples will be collected in accordance with EPA Environmental Response Team (ERT) Standard Operating Procedure (SOP) # 2012.

**Wipe Sampling:** Wipe samples will be collected from throughout the Site and off site locations and be submitted for asbestos TEM analysis, via the ASTM D6480-05 method. Samples will be collected utilizing dedicated Ghost Wipe™ pre-moistened sterile sampling pads. Each sample will be collected from a 10cm X 10cm (100 sq. cm) area, using a dedicated disposable template for each sample. The marked surface area to be sampled will be wiped firmly vertically and then horizontally to ensure complete surface coverage for analysis. The wipe samples will be placed in poly bags; therefore; no equipment decontamination will be required. All wipe samples will be collected in accordance with EPA ERT SOP # 2011.

**Bulk Sampling:** Bulk asbestos sample collection procedures will be dependent upon the location of the suspected asbestos-containing material (ACM). An approximately 3 to 4-inch section of the ACM will be cut from the underlying structure using a safety utility knife. The sample area will be re-wetted and the ACM will be carefully removed and placed into the wet re-sealable plastic bag. After sealing the suspected ACM in the plastic bag, the exterior of the bag will be wetted, wiped with a clean paper towel, and placed into a second re-sealable plastic bag. Bulk asbestos samples will be submitted for asbestos analysis via EPA Method EPA/600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials. All bulk samples will be collected in accordance with EPA ERT SOP #2001.

**Air Sampling:** All air samples will be collected using dedicated sampling equipment; (0.45 µm, 25 mm cellulose ester membrane cartridge and high-volume sampling pumps for asbestos) therefore, no equipment decontamination will be required. For NIOSH 7400 and 7402 Methods, approximately 3,500 liter volume will be collected at the rate of 9 to 11 liters/minute for 6-7 hours period of time to achieve 0.0004 f/cc reporting limit as determined by the EPA OSC. Sample pumps will be calibrated in a clean zone using a high-volume flow meter, and a clean sample cartridge (with cover) of the same type as that used during sample collection. The initial flow rate is established based on the target sample volume and duration of sample collection. All air samples will be collected in accordance with EPA ERT SOP # 2008 and 2015.

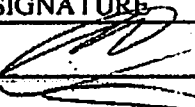
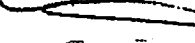



**Micro-vac Sampling:** Micro-vac surface-dust samples will be collected from the interior of properties using a 0.45 µm, 25 mm cellulose ester membrane cartridge and a low-volume pump. A small piece of tubing, about two inches in length and cut at a 45° angle, will be placed at the end of the cartridge. Each sample will be collected from a 10cm X 10cm (100 sq. cm) area, using a dedicated disposable template for each sample. The marked surface area to be sampled will be vacuumed for at least two minutes until all visible dust has been removed. The cartridge and the two inch piece of tubing will be sent to a laboratory for asbestos analysis via the ASTM D5755-09 method. All micro-vac samples will be collected in accordance with EPA ERT SOP # 2011.

Was laboratory notified of potential hazard level of samples? ☒ Yes ☐ No

Note: The nature of the work assignment may require the use of the following procedures/programs which will be included as attachments to this HASP as applicable: Emergency Response Plan, Confined Space entry Procedures, Spill Containment Program.

Disclaimer: This Health and Safety Plan (HASP) was prepared for work to be conducted under the RST 3 Contract EP-S2-14-01. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

PRINTED NAME	SIGNATURE	AFFILIATION	DATE
Carlos Huerta		RST3	7/1/2014
Errik C. Adams		RST3/WESTON	7/22/14
Angel Alcega		RST3	9/5/14
Peter Lisichaveno		RST3	9/9/14
Angel C. Rodriguez		USEPA	7/1/2014

**Post-Response Approval**

Final Submission of HASP by:		Date:
Post Response Approval by:		Date:
RST 3 HSO Review by:		Date:

## Air Monitoring Summary Log

Date: \_\_/\_\_/\_\_

Data Collected by: \_\_\_\_\_

Station/Location	CGI / O <sub>2</sub> Meter / CL <sub>2</sub> / H <sub>2</sub> S	Radiation Meter	PID	FID / TVA-1000	Other (_____)

**ATTACHMENT A:**  
**NIOSH POCKET GUIDES**



## Search the Pocket Guide

Enter search terms separated by spaces.

## Asbestos

**Synonyms & Trade Names** Actinolite, Actinolite asbestos, Amosite (cummingtonite-grunerite), Anthophyllite, Anthophyllite asbestos, Chrysotile, Crocidolite (Riebeckite), Tremolite, Tremolite asbestos

**CAS No.** 1332-21-4

**RTECS No.** [CI6475000 \(/niosh-rtecs/CI62CCF8.html\)](http://niosh-rtecs/CI62CCF8.html)

**DOT ID & Guide** 2212 171 (<http://www.wapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=171>) (blue, brown) 2590 171 (<http://www.wapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=171>) (white)

**Formula** Hydrated mineral silicates

**Conversion**



**IDLH** Ca [N.D.]  
See: [IDLH INDEX \(/niosh/idlh/intridl4.html\)](http://niosh/idlh/intridl4.html)

## Exposure Limits

**NIOSH REL** : Ca See Appendix A ([nengapdx.html](http://nengapdx.html)) See Appendix C ([nengapdx.html](http://nengapdx.html))

**OSHA PEL** : [1910.1001] [1926.1101] See Appendix C ([nengapdx.html](http://nengapdx.html))

## Measurement Methods

**NIOSH** 7400  ([/niosh/docs/2003-154/pdfs/7400.pdf](http://niosh/docs/2003-154/pdfs/7400.pdf)), 7402  ([/niosh/docs/2003-154/pdfs/7402.pdf](http://niosh/docs/2003-154/pdfs/7402.pdf));

**OSHA ID160**

(<http://www.osha.gov/dts/sltc/methods/inorganic/id160/id160.html>)  
(<http://www.cdc.gov/Other/disclaimer.html>), **ID191**  
(<http://www.osha.gov/dts/sltc/methods/inorganic/id191/id191.html>)  
(<http://www.cdc.gov/Other/disclaimer.html>)

See: **NMAM** ([/niosh/docs/2003-154/](http://niosh/docs/2003-154/)) or **OSHA Methods**  
(<http://www.osha.gov/dts/sltc/methods/index.html>) (<http://www.cdc.gov/Other/disclaimer.html>)

**Physical Description** White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite) fibrous, odorless solids.

**MW:** Varies

**BP:** Decomposes

**MLT:** 1112°F  
(Decomposes)

**Sol:** Insoluble

**VP:** 0 mmHg (approx)

**IP:** NA

**Sp.Gr:** ?

**FLP:** NA

**UEL:** NA

**LEL:** NA

Noncombustible Solids

**Incompatibilities & Reactivities** None reported

**Exposure Routes** inhalation, ingestion, skin and/or eye contact

**Symptoms** Asbestosis (chronic exposure): dyspnea (breathing difficulty), interstitial fibrosis, restricted pulmonary function, finger clubbing; irritation eyes; [potential occupational carcinogen]

**Target Organs** respiratory system, eyes

**Cancer Site** [lung cancer]

**Personal Protection/Sanitation** (See [protection codes \(protect.html\)](http://protectioncodes(protect.html)))

**Skin:** Prevent skin contact

**Eyes:** Prevent eye contact

**Wash skin:** Daily

**Remove:** No recommendation

**Change:** Daily

**First Aid** (See [procedures \(firstaid.html\)](http://procedures(firstaid.html)))

**Eye:** Irrigate immediately

**Breathing:** Fresh air

**Respirator Recommendations**

(See Appendix E) ([nengapdx.html](http://nengapdx.html))

**NIOSH**

**At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:**

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

**Escape:**

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.

Any appropriate escape-type, self-contained breathing apparatus

[Important additional information about respirator selection \(pgintrod.html#mustread\)](#)

See also: [INTRODUCTION \(/niosh/npg/pgintrod.html\)](#)

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Page last reviewed: April 4, 2011

Page last updated: November 18, 2010

Content source: [National Institute for Occupational Safety and Health \(NIOSH\)](#) Education and Information Division

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Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA  
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)



ATTACHMENT B:

WESTON FLDS

## FLD 02 INCLEMENT WEATHER

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

### RELATED FLDs AND OP

*FLD 05 – Heat Stress Prevention and Monitoring*

*FLD 06 – Cold Stress*

*OP 05-03-008 – Inclement Weather & Business Disruption Policy*

### PROCEDURE

The potential for exacerbating the impact of physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment and hazards analysis should be accomplished during the planning stages of a project for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The Field Safety Officer (FSO) must determine the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his/her work and be actively alert to these hazards. Managers and workers must be familiar with the requirements of FLD 05 and FLD 06.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and personal protective equipment (PPE) function must be conveyed to site workers who should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The appropriate Safety Professional **must be notified of all instances of the need to stop work for safety reasons, including inclement weather.**

### Heat

Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

#### Prevention and Protective Measures

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed PPE. Wind shifts and velocity should be measured where change may result in dispersion of airborne contaminants into the work area.

### Rain, Wet Weather, and High Humidity

Wet conditions resulting from rain and wet weather increase slipping and tripping hazards, braking distances of vehicles, the potential for vehicle skidding, or difficulties in handling powered devices such as augers and drills. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock

when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces. Rain and wet conditions may decrease visibility (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

Feet that become wet and are allowed to remain wet can lead to serious problems under both heat and cold conditions. Activities that may result in wet feet include extended work in chemical protective clothing and wading in water/liquid during biological assessments. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration. (NOTE: The following Preventive and Protective Measures also apply to Cold, Snow, and Ice.)

### Preventive and Protective Measures

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow. Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.

Vehicles used in rain or cold weather must have working windshield wipers and defrosters, and windows must be kept clear of obstruction.

Drivers must observe traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times. Note that this may mean operating below the posted speed limit.

When walking, workers should use a walking stick or probe to test footing ahead where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

Prior to using vehicles or equipment in off-road work, workers should walk the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Project managers should arrange to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided.**

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

### **Cold, Snow, and Ice**

Cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision. Cold, wet weather can cause icing of roadways,

driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

### Preventive and Protective Measures

WESTON personnel are cautioned against operating motor vehicles such as cars or trucks on ice under any circumstances. If traveling in icy conditions, WESTON personnel should follow all public service advisories that curtail driving activities.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurement guidelines are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factors impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed (contains entrained air) is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

## **Lightning**

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

Lightning is the most dangerous and frequently encountered weather hazard people experience each year. Lightning affects all regions. **Florida, Michigan, Pennsylvania, North Carolina, New York, Ohio, Texas, Tennessee, Georgia, and Colorado** have the most lightning deaths and injuries.

### Preventive and Protective Measures

Prior to working in areas or beginning projects when or where there is an increased potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes. Recommendations include:

- Check with client management to determine if there are any patterns or noted conditions that can help predict lightning or if there are structures that are prone to lightning strikes. Arrange for

client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.

- Monitor weather reports.
- Note weather changes and conditions that produce lightning.
- Stop work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- Ensure all personnel are provided with safe areas of refuge. Prevent personnel from standing in open areas, under lone trees, or under drill rigs.
- Observe the “30-30” Rule. If you see lightning and thunder is heard within 30 seconds (approximately 6 miles), seek shelter. If you hear thunder, but did not see the lightning, you can assume that lightning is within 6 miles and you should seek shelter. Remain in the sheltered location for 30 minutes following the last lightning strike.
- Use a hand held static potential meter (lightning detection device) to monitor the potential difference between a cloud and the ground. When the measured potential is greater than 2 kV/m, there is a potential for a lightning strike – seek shelter.

## **High Wind and Tornado Safety**

### High Winds

Many construction workers have died due to wind-related accidents and injuries. A ladder that seems secure under normal circumstances can become unstable during windy conditions and cause you to fall. Scaffolding that is improperly secured can rip free during strong winds and kill bystanders. The risk of injury for construction workers increases during strong winds. Keep in mind that changing weather conditions can affect your daily work tasks, and make sure you have a game plan to prevent proper damage and personal injury.

Stay Informed: With today’s modern technology available at the touch of a button, you should keep up to date with the latest local weather reports. Visit [weatherbug.com](http://weatherbug.com) or [weather.gov](http://weather.gov) to stay informed in case of wind warnings, watches, and advisories. Larger projects may have their own weather station on site to provide instant weather data. Use daily hazard assessments to determine if working conditions have changed or will change throughout the day.

Be Prepared: When you know the weather will be windy, secure loose building materials, scaffolding and fencing that could be picked up or torn loose by strong winds and thrown onto surrounding streets, structures, vehicles, or bystanders.

Know the Limits of Your Equipment: When operating any equipment, take time to read the operator’s manual and become familiar with the wind specifications. Many crane manufacturers have high-wind guidelines to prevent you from operating a crane in unsafe weather. You should also check safety equipment such as fall protection to determine if it is adequate for windy conditions.

## Know the Terminology

### Severe Thunderstorm Watch

A Severe Thunderstorm Watch means that strong thunderstorms capable of producing winds of 58 mph or higher and/or hail 3/4 inches in diameter or larger are possible. If you are in the area of a Severe Thunderstorm Watch, you should be prepared to take shelter from thunderstorms. Severe Thunderstorm Watches are generally issued for 6-hour periods.

### Severe Thunderstorm Warning

A Severe Thunderstorm Warning means that thunderstorms capable of strong winds and/or large hail are occurring or could form at any time. If you are in the area of a severe thunderstorm, you should take shelter indoors immediately, avoid windows, and be prepared for high winds and hail. Severe Thunderstorm Warnings are generally in effect for an hour or less.

### High Wind Watch

A High Wind Watch is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are likely to develop in the next 24 to 48 hours. For summit areas, high wind watches are issued when sustained winds are expected to exceed 45 mph and/or frequently gust over 60 mph. If you are in an area for which a High Wind Watch has been issued you should secure loose objects outdoors that may blow about and avoid outdoor activity that exposes you to high winds.

### High Wind Warning

A High Wind Warning is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are occurring or imminent. For summit areas, warnings are issued for winds exceeding 45 mph and/or frequently gusting over 60 mph. Wind warnings may issued up to 24 hours ahead of the onset of high winds and remain in effect for 6 to 12 hours. If you are in an area where a high wind warning is in effect you should avoid activities that expose you to high winds. Loose objects may be blown around. Tree limbs may break and fall. Power lines may be blown down.

### Wind Advisory

A Wind Advisory is issued when sustained winds of 30 to 39 mph and/or frequent gusts to 50 mph or greater are occurring or imminent. Wind advisories may be in effect for 6 to 12 hours. If you are in an area where a wind advisory is in effect you should secure loose objects that may be blown about outdoors and limit activity that may expose you to high winds.

Work Safely: If you will be working on a windy day, you should be alert and protected. Wear eye protection to prevent dust and other particles from entering or striking your eyes. Keep your hard hat on at all times to prevent injuries from falling or flying objects. The likelihood of falls from heights is greatly increased by strong winds. Wear the necessary PPE to ensure your safety.

To avoid flying debris and to minimize damage during high winds:

- Shut down outdoor activities involving work at elevation on ladders, scaffolding, aerial lifts, etc.; handling large tarps and plastic sheeting when wind speeds exceed 25 mph; including work with radioactive materials and highly toxic materials that could be dispersed by the winds.
- At 13 - 18 mph wind will raise dust. Follow the dust action level.

- Move mobile items stored outside to indoor storage.
- Secure any items that cannot be moved inside.
- Be careful opening exterior doors.
- Be cautious about downed power lines, tree limbs, and debris on roads.
- Be alert for animals who have escaped from farms and zoos.

Stay Away from Power Lines: High winds can cause tree limbs to fall on power lines resulting in electrocution hazards or loss of power. Your best bet is to keep your distance.

## Tornados

### What is a TORNADO?

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm or as a result of severe weather associated with hurricanes. A funnel cloud is formed as cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado results from high wind velocity and wind blown debris.

### Tornado Safety

When a tornado approaches, you have only a brief amount of time to make life-or-death decisions. Advance planning and quick response are the keys to surviving a tornado.

Purchase a NOAA Weather Alert radio with an alert feature. When tuned to the proper frequency, these weather radios remain silent until a weather emergency occurs. Once they pick up the alarm tone, they will begin broadcasting emergency weather information so that citizens can protect themselves and their property. Some models of the NOAA weather radio incorporate the Specific Area Message Encoder technology, allowing users to target only those warnings that affect their immediate geographic area.

Conduct tornado drills. Designate an area to serve as your safe area, and practice having team members assemble there in response to a mock tornado warning.

Emergency Communications Plan. Develop an emergency communications plan in case team members are separated from one another when a tornado warning goes into effect. Designate an emergency coordinator. Instruct everyone to contact this coordinator in a weather emergency for instructions on what to do during the storm and where to reassemble after the emergency has passed. Design contingency plans to be consistent with client contingency plans. When possible use client warning and alerting systems and confirm that team members have access to shelters and know how to get to them.

### Know the Difference between a Tornado Watch and a Tornado Warning

Tornado Watch: Issued by the National Weather Service when tornadoes are possible in your area. You should remain alert for approaching storms. Remind family members of where the safe areas are within your home, and carefully monitor radio or television reports for further developments.

Tornado Warning: Indicates that a tornado has been sighted in your area, or is indicated on weather radar. You should proceed to safe shelter immediately.

*When A Tornado Warning Goes In Effect, Put Your Safety Plans In Action.*

In Your Automobile: Motor vehicles are easily overturned by tornado winds. Leave your vehicle and seek shelter in a sturdy building. As a last resort, seek shelter in a ditch or culvert. Do not try to outrun or outmaneuver a tornado! Use the time to seek appropriate shelter outside your vehicle.

Office Buildings, Hotels, and Shopping Centers: Take shelter in an interior hallway on a lower floor. A closet, bathroom or other small room with short, stout walls will give some protection from collapse and flying debris. Otherwise, get under heavy furniture and stay away from windows. Many tornado deaths have occurred in large buildings due to the collapse of a roof or wide span wall. A corner area, away from a window, is safer than the middle of a wide span wall.

Out In Open Country: When severe weather approaches, seek inside shelter immediately. The chances of encountering falling trees, downed power lines and lightning are far greater than encountering a tornado itself. If a tornado approaches, lie flat in the nearest depression, such as a culvert or ditch, and cover your head with your arms.

**BE ALERT TO CHANGING WEATHER CONDITIONS**

**HAVE AN EMERGENCY WEATHER PLAN IN PLACE**

**REHEARSE YOUR CONTINGENCY PLANS PERIODICALLY**

**KNOW WHERE TO GO WHEN A TORNADO THREATENS.**



## **FLD 05 HEAT STRESS PREVENTION AND MONITORING**

Heat stress may occur at any time work is performed at elevated temperatures. If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur such as fatigue, irritability, anxiety, and decreased concentration or dexterity, and possibly death. Because heat stress is one of the most common and potentially serious illnesses at field sites, regular monitoring and other preventive measures are vital to ensure worker safety. Wearing chemical protective clothing often decreases natural body heat loss (cooling) and increases the risk of heat stress.

Employees who are taking prescription or over-the-counter medications should consult with their personal physician prior to working in high-temperature environments to see if their medication would impair their ability to handle heat stress.

### **REFERENCES**

OSHA 29 CFR 1910 and 1926

### **RELATED FLDs**

*FLD 02 – Inclement Weather*

*FLD 03 – Hot Processes – Steam, Low Temperature Thermal Treatment Unit, and Transportable Incinerator*

*FLD 08 – Confined Space Entry Program*

*FLD 36 – Welding/Cutting/Brazing/Radiography*

*FLD 37 – Pressure Washers/Sandblasting*

### **PROCEDURE**

#### **Heat Stress Symptoms and Treatment**

##### Heat Rash

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation and is aggravated by chafing clothes. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impairs a worker's performance.

Symptoms – Mild red rash, especially in areas of the body that come into contact with protective gear.

Treatment – Decrease amount of time spent working in protective gear and provide body powder to help absorb moisture and decrease chafing. Heat rash can be prevented by showering, resting in a cool place, and allowing the skin to dry.

##### Heat Cramps

Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water; however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue, causing cramping.

Symptoms – Acute painful spasms of voluntary muscles, most notably the abdomen and extremities.

*Treatment* – Move the victim to a cool area and loosen clothing. Have the victim drink 1 to 2 cups of cool potable water or diluted commercial electrolyte solution (e.g., Gatorade, Quench) immediately, and then every 20 minutes thereafter until symptoms subside. Electrolyte supplements can enhance recovery; however, it is best to double the amount of water required by the dry mix package directions or add water to the liquid form.

### Heat Exhaustion

Heat exhaustion is a state of weakness or exhaustion caused by the loss of fluids from the body. Heat exhaustion is not as dangerous as heat stroke, but if not properly managed in the field it may lead to heat stroke.

*Symptoms* – Pale, clammy, and moist skin, profuse perspiring, and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, may feel dizzy, and may be irritable or confused.

*Treatment* – Move the victim to a cool, air-conditioned or temperature-controlled area, loosen clothing, place in a position with the head lower than the feet (shock prevention), and allow the victim to rest. Consult a physician. Ensure that the victim is not nauseated or vomiting. If not nauseated or vomiting, give the victim small sips of cool water or diluted electrolyte replenishment solution (one to one dilution with water, or if mixing from powder, double the water added). If this is tolerated, have the victim drink 1 to 2 cups of fluid immediately, and every 20 minutes thereafter until symptoms subside. Seek medical attention at the advice of the consulting physician.

### Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body's heat regulating mechanisms, i.e., the individual's temperature control system (sweating) stops working correctly. Body temperature rises so high that brain damage and death may result if the person is not cooled quickly.

*Symptoms* – Red, hot, dry skin (although the person may have been sweating earlier); nausea, dizziness, confusion, extremely high body temperature (i.e., 104°F or greater as measured with an oral thermometer), rapid respiratory and pulse rate, seizures or convulsions, unconsciousness or coma.

*Treatment* – Immediately call for emergency medical assistance. Remove the victim from the source of heat and cool the victim quickly. If the body temperature is not brought down quickly, permanent brain damage or death may result. Remove all PPE and as much personal clothing as decency permits. Fan the person while sponging or spraying with cool or tepid water. Apply ice packs (if available) to the back of the neck, armpits, groin area, or behind the knees. Place the victim flat on their back or with head and shoulders slightly elevated. If conscious, and not nauseated or vomiting, the victim may be provided sips of cool water. Do not give the victim coffee, tea, or alcoholic beverages. Emergency medical personnel will take over treatment when they arrive.

## **Recognition and Risk Assessment**

In the planning stages of a project, the potential for heat stress disorders must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely heat stress disorders that may occur. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not

followed or the risk is too great. In addition, all site personnel must be aware of these symptoms in both themselves and their co-workers.

### **Prevention and Protection Programs**

Heat stress is affected by several interacting factors including, but not limited to, age, obesity, physical condition, substance abuse, level of personal protective equipment (PPE) worn, and environmental conditions (temperature, shade, and humidity). Site workers must learn to recognize and treat the various forms of heat stress. The following recommendations should be followed to prevent heat stress:

- The most important measure to prevent heat-related illness is adequate fluid intake. Workers should drink 1/2 to 1 quarts of liquids per hour in high heat conditions. Most of this liquid should be water. Under heavy work and heat conditions, the body may lose up to 2 gallons of fluids per day. To prevent heat stress symptoms, the individual must ensure replacement of this fluid.
- Provide disposable cups that hold about 4 ounces, and water that is maintained at 50 to 60°F. Workers should drink 16 ounces of water before beginning work, and a cup or two at each break period.
- Provide a shaded area for rest breaks. Ensure that adequate shelter is available to protect personnel against heat and direct sunlight. When possible, shade the work area.
- Discourage the intake of caffeinated drinks during working hours.
- Monitor for signs of heat stress.
- Encourage workers to maintain a good diet during these periods. In most cases, a balanced diet and lightly salted foods should help maintain the body's electrolyte balance. Bananas are especially good for maintaining the body's potassium level.
- If utilizing commercial electrolyte mixes, double the amount of water called for in the package directions. Indications are that "full-strength" preparations taken under high heat stress conditions may actually decrease the body's electrolytes.
- Acclimate workers to site work conditions by slowly increasing workloads (i.e., do not begin work activities with extremely demanding tasks).
- Rotate shifts of workers who are required to wear impervious clothing in hot weather.
- Encourage workers to wear lightweight, light-colored, loose-fitting clothing.
- In extremely hot weather, conduct field activities in the early morning and evening.
- Provide cooling devices to aid natural body heat regulation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
- Good hygienic standards must be maintained by frequent showering and changes of clothing.
- Clothing should be permitted to dry during rest periods.
- Whenever working in the sun, provide employees with sunscreen with both UVA and UVB protection.
- Persons who notice skin problems should immediately consult medical personnel.

## Heat Stress Monitoring and Work Cycle Management

When strenuous field activities are part of on-going site work conducted in hot weather, the following guidelines should be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the temperature exceeds 70°F and the tasks/risk analysis indicates an increased risk of heat stress problems. Consult the HASP and a safety professional (e.g., Division EHS Manager, FSO) if questions arise as to the need for specific heat stress monitoring. In all cases, the site personnel must be aware of the signs and symptoms of heat stress and provide adequate rest breaks and proper aid as necessary.

Measure Heart Rate – Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the rest period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.

Measure Body Temperature – When ambient temperatures are over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the rest period. If the oral temperature exceeds 99.6°F (or 1 degree change from baseline) at the beginning of the rest period, the following work cycle should be shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F (or 1 degree change from baseline). Under no circumstances should a worker be allowed to work if their oral temperature exceeds 100.6°F.

Measure Body Water Loss – Body water loss greater than 1.5% of total body weight is indicative of a heat stress condition. Body weight is measured before PPE is donned and after the PPE is removed following a work cycle. Body water loss can be measured with an ordinary bathroom scale; however, the scale must be sensitive to one-half pounds increments. A worker is required to drink additional fluids and rest if their body water loss is greater than 1.5%.

**NOTE:** For purposes of this operating practice, a break is defined as a 15-minute period and/or until an individual's vital signs are within prescribed guidelines.

A physiological monitoring schedule is determined by following the steps below:

- Measure the air temperature with a standard thermometer.
- Estimate the fraction of sunshine by judging what percent the sun is out (refer to Table 1).
- Calculate the adjusted temperature based on the following formula:  
$$\text{Adjusted Temperature} = \text{Actual Temperature} + 13 \times X \text{ (where } X = \text{sunshine fraction from Table 1)}$$
- Using Table 2, determine the physiological monitoring schedule for fit and acclimated workers for the calculated adjusted temperature.

The length of work period is governed by frequency of physiological monitoring (Table 2). The length of the rest period is governed by physiological parameters (heart rate and oral temperature).

**Table 1. Percent Sunshine Factors  
Heat Stress Prevention and Monitoring**

<b>Percent Sunshine (%)</b>	<b>Cloud Cover</b>	<b>Sunshine fraction</b>
100	No cloud cover	1.0
50	50% cloud cover	0.5
0	Full cloud cover	0.0

**Table 2. Physiological Monitoring Schedule  
Heat Stress Prevention and Monitoring**

<b>Adjusted Temperature</b>	<b>Level D (Permeable clothing)</b>	<b>Level C, B, or A (Nonpermeable clothing)</b>
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°F (30.8° - 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° - 87.5°F (28.1° - 32.2°C)	After each 90 minutes of work	After each 60 minutes of work
77.5° - 82.5°F (25.3° - 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° - 77.5°F (22.5° - 25.3°C)	After each 150 minutes of work	After each 120 minutes of work

**Example:** Site personnel anticipate wearing level C (impermeable clothing) during site activities. The air temperature is 80°F and there are no clouds in the sky (100% sunshine). The adjusted temperature is calculated in the following manner:

$$\begin{aligned}\text{Adjusted Temperature (Adj T } ^\circ\text{F)} &= \text{Actual Temperature (Amb T } ^\circ\text{F)} + (13 \times \text{sunshine fraction}) \\ \text{Adj T } ^\circ\text{F} &= 80^\circ\text{F} + (13 \times 1.0) \\ \text{Adj T } ^\circ\text{F} &= 93^\circ\text{F}\end{aligned}$$

Using Table 2, the pulse rate, oral temperature and body water loss monitoring would be conducted after each 15 minutes of work. The adjusted temperature may need to be redetermined if the percent sunshine and ambient temperature changes drastically during site work.

If an individual's heart rate exceeds 110 beats per minute at the beginning of the rest period, that individual will continue to rest until his or her heart rate drops to baseline; the next work period is then decreased by 33%.

## **FLD 11 ROUGH TERRAIN/ATV USE**

### **RELATED FLDs**

*FLD 02 – Inclement Weather*

*FLD 05 – Heat Stress Prevention and Monitoring*

*FLD 06 – Cold Stress*

*FLD 22 – Heavy Equipment Operation*

*FLD 47 – Clearing, Grubbing, and Logging Operations*

*FLD 57 – Motor Vehicle Safety*

### **HAZARD**

Physical hazards associated with rough terrain include vehicle accidents, heavy equipment incidents, falling, slipping, and tripping.

Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles.

When working on foot, steep inclines and heavy or downed vegetation can hide holes or breaks in the terrain, increasing the risk of slips, trips, and falls.

### **RECOGNITION AND RISK ASSESSMENT**

Rough terrain complicates work activities and adds to or increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard and identified in the site-specific health and safety plan (HASP). Risk assessment is usually accomplished from site history information (i.e., site topography) and on site by the Field Safety Officer (FSO).

### **HAZARD PREVENTION AND PROTECTION PROGRAMS**

#### **Safety on Foot**

Personnel working on rough terrain should maintain a high level of physical conditioning due to increased body stress and exertion.

The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls.

Boots should be ankle high or higher to provide additional support and stability.

Work will be completed in adequate natural light or sufficient illumination will be maintained.

Site personnel will conduct an initial walkover and the “buddy system” will be implemented.

Emergency communications such as a cell phone or two-way radio should be carried at all times.

Personnel should be aware of potential hazards and ensure the availability of first-aid supplies and knowledge of the location of the nearest medical assistance.

#### **VEHICLE SAFETY**

Vehicle drivers and passengers will wear seatbelts at all times.

Hazards can be prevented by ensuring regular maintenance is performed on vehicles and all safety features are working. Have brakes and wheel bearings of vehicles used off road or in four wheel drive inspected at increased frequency (suggest inspections at twice the manufacturer's recommended frequency).

In order to minimize accidents, site surveillance on foot may be required to ensure clear driving paths.

Minimize side hill travel. Travel straight up and down hills whenever possible. Passengers will not be allowed when side hill travel is required.

Take into account loads or superstructure of vehicles which raise the center of gravity and increase risk of tipping.

Cross streams, small logs or other passable (there is adequate clearance of the undercarriage) obstructions at right angles.

Four wheel drive vehicles should be used if terrain conditions are wet, frozen, broken, or otherwise deemed unsafe for two wheel drive vehicles by the FSO. Use of vehicles off-road will be specifically addressed in the HASP and personnel operating vehicles will be checked for proficiency.

- Before moving a vehicle in the field, first walk the route of travel, inspecting for depressions, stumps, gullies, ruts, and similar obstacles.
- Always check the brakes of a vehicle before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Engage the all wheel drive when traveling off highway on hilly terrain.
- Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- After the vehicle/equipment has been moved to a new site, set all brakes and/or locks. When grades are steep, block the wheels.

## **Definitions**

**Class I, All-terrain vehicle (ATV):** A motorized off-highway vehicle, 50 in. (127 cm) or less in width, having dry weight of 800 lbs (362.9 kg) or less, and traveling on three or more low pressure tires (10 lbs [4.5 kg] psi or less), with a seat designed to be straddled by the operator.

**Class I, Category G, ATV:** An ATV intended for general recreational and utility use.

**Class I, Category U, ATV:** An ATV intended primarily for utility use.

**Class II, ATV:** A motorized off-highway vehicle with a width which exceeds 50 in. (127 cm) or having a dry weight that exceeds 800 lbs (362.9 kg), traveling on four or more low-profile, low-pressure tires (10 lbs [4.5 kg] psi or less) and having a bench seat.

**NOTE:** Utility Vehicles are designed to perform off-road utility tasks such as passenger and cargo transportation and are addressed separately below. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Rollover Protective Structure (ROPS). A cab or frame that provides a safe environment for the tractor operator in the event of a rollover.

## **ALL TERRAIN VEHICLES (ATVS)**

### **Qualifications**

ATV operators will have completed a nationally recognized accredited ATV training course (such as provided by the Specialty Vehicles Institute of America or in-house resources that have been certified as trainers by an accredited organization) prior to operation of the vehicle.

The operator must pass an operating skills test prior to being allowed to operate an ATV. Proof of completion of this training will be maintained.

### **Equipment**

All ATVs shall be equipped with:

- An operable audible warning device (horn);
- Headlights (if it will be used during hours of darkness);
- Taillights; and
- Brake lights.
- Mufflers and spark arresters.

All Class II ATVs will be equipped with ROPS and seatbelts

### **Operation**

Only Class I and Class II ATVs with four or more wheels may be used. Class III ATV's may not be used.

The manufacturer's recommended payload will not be exceeded at any time.

Gloves and an approved motorcycle helmet with full-face shield or goggles will be worn at all times while operating a Class I ATV.

An ATV will not be driven on public roadways except to cross the roadway, and it will only be driven on a public roadway at designated crossing points or with a road guard (no paved road use unless allowed by the manufacturer).

A copy of the operator's manual will be kept on the vehicle and protected from the elements (if practicable).

Tires shall be inflated to the pressures recommended by the manufacturer.

Passengers are prohibited on Class I ATVs.



## UTILITY VEHICLES

Utility vehicles are defined as specialty Class II ATVs designed to perform off-road utility tasks such as passenger and cargo transportation. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Utility vehicle operators shall be trained and familiar with the use of all controls; understand proper moving, stopping, turning and other operating characteristics of the vehicle. Operators must review all training materials provided by the manufacturer for the specific vehicles, and training should be in accordance with appropriate manufacturer recommendations. A copy of the operator's manual shall be kept on the vehicle at all times and protected from the elements. At a minimum, training should address:

- Basic riding tips from the manufacturer's published literature for each vehicle.
- Reading terrain.
- Climbing hilly terrain.
- Descending a hill.
- Traversing a slope.
- Riding through water.
- Cargo carriers and accessories.
- Loading and unloading.
- Troubleshooting.
- Proper preventative maintenance, (i.e., oil levels, tire pressure requirements and scheduled maintenance requirements according to the manufacturer's guidelines.).

Utility vehicles shall be equipped with:

- Operable audible warning device (horn).
- Headlights.
- Taillights.
- Brake lights.
- Seatbelts.
- ROPS.

Occupancy in utility vehicles is limited to manufacturer designated seating that has built-in seatbelts. Passengers may not ride in the vehicle's back cargo area unless the vehicle is otherwise equipped. Note: When used for emergency response, medical litters may be placed in the back cargo area but must be secured as described below.

The manufacturer's recommended load carrying capacity, personnel capacity, or maximum safe vehicle speed shall not be exceeded at any time.

Cargo items will be secured as necessary to prevent movement/tipping. All loads over fifty pounds (to include medical litters) must be securely strapped to cargo tie-downs in the rear and to the cargo shelf in the front.

Seatbelts will be worn by operators and passengers of specialty vehicles where installed by the manufacturer. Operators and passengers shall wear goggles at all times when a utility vehicle, not equipped with a windshield, is in motion.

Utility vehicles will not normally be driven on public roadways except to cross the roadway, and will only be driven on a public roadway at designated crossing points or with a road guard. Utility vehicles that are allowed to operate outside a controlled work area and/or on public roads will meet the minimum vehicle safety standards in accordance with 49 CFR 571.5, to include ROPs, seatbelts and placement of “Slow Moving Vehicle” emblems where required.

Manufacturer-installed safety equipment will be maintained in working order and used in compliance with the requirement of this regulation and in accordance with manufacturer’s recommendations.

## **RULES**

Observe the following practices to help prevent accidents:

- Do not misuse utility vehicles.
- Reduce speed and exercise extreme caution on slopes or on rough ground.
- Do not overload vehicle and avoid shifting loads. Reduce load when operating over rough or hilly terrain.
- Do not stop or start suddenly when going uphill or downhill. Be especially cautious when changing direction on slopes.
- Stay alert for holes, rocks, and other hidden hazards in the terrain.
- Keep away from drop-offs, ditches, embankments, as well as ponds and other bodies of water. The machine could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
- Keep front wheels straight at crest of hill or going over bumps.
- When descending a hill, remove foot from accelerator and apply brakes to reduce speed and maintain control.

## **Transport Loads Safely**

- Be sure load is evenly distributed.
- Do not load above the load guard.
- Securely anchor all loads in cargo box.
- Reduce cargo box capacity when operating on rough or hilly terrain.
- Use existing trails. Avoid terrain such as dangerous slopes and impassable swamps. Watch carefully for sharp bumps, holes, ruts, or obstacles.
- Look ahead at terrain. Know what is coming and be prepared to react. Be alert for hazards.
- Keep front wheels straight at the crest of a hill or going over bumps.
- Reduce speed according to trail, terrain, and visibility conditions.
- The passenger should always use the hand holds.

### **Climbing or Descending a Hill**

- Always use the brakes when going down slopes, the utility vehicle can speed up (freewheel) going down a slope. Engine or clutch braking effect is minimal.
- Balance loads evenly and secure them. Braking could shift the load and affect vehicle stability.
- Sit on the center of the seat and keep both feet within the foot platform.
- Never drive past the limit of visibility. Slow down near the crest of a hill until getting a clear view of the other side.
- If the vehicle stops or loses power going up a hill, lock the park brake to hold the vehicle on slope. Maintain direction of travel and release the brake slowly. Back straight down hill slowly while maintaining control. Do not turn the vehicle sideways. The vehicle is more stable in a straight forward or rearward position.
- If the utility vehicle begins to tip, turn the front wheel downhill to gain control before proceeding.

### **Riding Through Water**

- Avoid water whenever possible. If the drive belt becomes wet, slippage will occur and the vehicle will lose power.
- Never cross any body of water where the depth may be unknown to the operator. As an operational guideline, deep water is considered anything in excess of 152 mm (6 in.) in depth. Tires may float, making it difficult to maintain control.
- Choose a course within the waterway where both banks have a gradual incline. Cross at a point known to be safe.
- Proceed at a slow steady speed to avoid submerged obstacles and slippery rocks.
- Avoid water crossings where the operation of a utility vehicle may cause damage to waterway beds or erode waterway shoreline.

## **FLD 22 EARTH MOVING EQUIPMENT/MATERIAL HANDLING EQUIPMENT**

### **REFERENCES**

*29 CFR Part 1926 Subparts 600-602*

### **RELATED FLDs**

*FLD 23 – Cranes, Rigging, and Slings*

*FLD 24 – Aerial Lifts/Manlifts*

*FLD 34 – Utilities*

*FLD 35 – Electrical Safety*

### **PROCEDURE**

These rules apply to the following types of earthmoving equipment: scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.

#### **Machinery and Mechanized Equipment Safety**

Before any machinery or mechanized equipment is placed in use, it will be inspected and tested by a competent mechanic and certified to be in safe operating condition.

WESTON will designate a competent person to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Tests will be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition.

Preventative maintenance procedures recommended by the manufacturer will be followed.

Any machinery or equipment found to be unsafe shall be removed from service and its use prohibited until unsafe conditions have been repaired or corrected.

Inspections or determinations of road conditions and structures will be made in advance to ensure that clearances and load capacities are safe for the passing or placement of any machinery or equipment.

Machinery and mechanized equipment will be operated only by designated personnel. Equipment deficiencies observed at any time that affect safe operation will be corrected before continuing operation.

Seat belts shall be provided on all equipment covered by this section and shall meet the requirements of the Society of Automotive Engineers (J386-1969) and Seat Belts for Construction Equipment. Seat belts for agricultural and light industrial tractors shall meet the seat belt requirements of Society of Automotive Engineers (J333a-1970), Operator Protection for Agricultural and Light Industrial Tractors.

Seat belts shall be worn when provided by the manufacturer. Passengers shall not be allowed to ride on equipment unless equipment is designed with additional seats with safety belts.

**Audible alarms.** All bi-directional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. The horn shall be maintained in an operative condition.

Getting off or on any equipment while it is in motion is prohibited.

Machinery or equipment requiring an operator will not be permitted to run unattended.

Machinery or equipment will not be operated in a manner that will endanger persons or property, nor will the safe operating speeds or loads be exceeded.

All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. The only exemption is equipment designed to be serviced or maintained while running.

All repairs on machinery or equipment will be made at a location that will provide protection from traffic or other hazards to maintenance personnel.

Machinery and equipment, or parts thereof, that are suspended or held apart by slings, hoists, or jacks also will be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

Bulldozer and scraper blades, front end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

Stationary machinery and equipment will be placed on a firm foundation and secured before being operated.

All points requiring lubrication during operation will have fittings so located or guarded to be accessible without hazardous exposure.

When necessary, all mobile equipment and the operating area will be adequately illuminated while work is in progress.

Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shutoff that will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

All towing devices used on any combinations of equipment will be securely mounted and structurally adequate for the weight drawn.

Persons will not be permitted to get between a piece of towing equipment and the item being towed until the towing equipment has come to a complete stop.

All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.

All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.

Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have the wheels chocked or track mechanism blocked and the parking brake set. Equipment such as lift trucks and stackers will have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also will be clearly shown on the vehicle. The ratings will not be exceeded.

Steering or spinner knobs will not be attached to the steering wheel unless the steering mechanism prevents road reactions from causing the steering hand wheel to spin. When permitted, the steering knob will be mounted within the periphery of the wheel.

All industrial trucks in use will meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation, defined in American National Standards Institute (ANSI) B56.1, Safety Standards for Powered Industrial Trucks.

The installation of live booms on material and personnel hoists is prohibited.

The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed.

Personnel will not work or pass under the buckets or booms of loaders in operation.

Cranes and any other equipment used for lifting must be inspected as required and records of inspection must be maintained.

### **Drill Rigs**

See FLD 56, *Drilling Safety*

## **FLD 39 ILLUMINATION**

### **RELATED FLDs**

*FLD 08 – Confined Space Entry Program*  
*FLD 10 – Manual Lifting and Handling of Heavy Objects*  
*FLD 12 – Housekeeping*  
*FLD 13 – Structural Integrity*  
*FLD 18 – Operation and Use of Boats*  
*FLD 22 – Heavy Equipment Operation*  
*FLD 23 – Cranes, Rigging, and Slings*  
*FLD 33 – Demolition*  
*FLD 38 – Hand and Power Hand Tools*

### **PROCEDURE**

While work is in progress, offices, facilities, access-ways, working areas, construction roads, etc., will be lighted by at least the minimum light intensities specified in Table 1.

Office lighting will be in accordance with American National Standards Institute (ANSI)/ Illuminating Engineering Society of North America (IESNA) RP-1.

Roadway lighting will be in accordance with ANSI/IESNA RP-8.

Marine lighting will be in accordance with ANSI/IESNA RP-12.

### **Means of Egress**

- Means of egress will be illuminated, with emergency and non-emergency lighting, to provide a minimum of 1 footcandle (fc) (lumens per square foot [ $\text{lm}/\text{ft}^2$ ]) (11 lux [lx], measured at the floor. (Reference NFPA 101)
- The illumination will be arranged so that the failure of any single lighting unit, including the burning out of an electric bulb, will not leave any area in total darkness.

Lamps and fixtures will be guarded and secured to preclude injury to personnel. Open fluorescent fixtures will be provided with wire guards, lenses, tube guards and locks, or safety sockets that require force in the horizontal axis to remove the lamp.

Lamps for general illumination shall be protected from accidental contact or breakage. Protection shall be provided by elevation of at least 7 ft (2.1 m) from normal working surface or suitable fixture or lamp holder with a guard.

**TABLE 1 - MINIMUM LIGHTING REQUIREMENTS**

<b>Facility or Function</b>	<b>Illuminance – lx (lm/ft<sup>2</sup>)</b>
Accessways	
– general indoor	55 (5)
– general outdoor	33 (3)
– exitways, walkways, ladders, stairs	110 (10)
Administrative areas (offices, drafting/meeting rooms, etc.)	540 (50)
Chemical laboratories	540 (50)
Construction Areas	
– general indoor	55 (5)
– general outdoor	33 (3)
– tunnels and general underground work areas, (minimum 110 lx required at tunnel and shaft heading during drilling, mucking, and scaling)	55 (5)
Conveyor routes	110 (10)
Docks and loading platforms	33 (3)
Elevators (freight and passenger)	215 (20)
First-aid stations and infirmaries	325 (30)
Maintenance/Operating Areas/Shops	
– vehicle maintenance shop	325 (30)
– carpentry shop	110 (10)
– outdoors field maintenance area	55 (5)
– refueling area, outdoors	55 (5)
– shops, fine detail work	540 (50)
– shops, medium detail work	325 (30)
– welding shop	325 (30)
Mechanical/electrical equipment rooms	110 (10)
Parking areas	33 (3)
Toilets, wash, and dressing rooms	110 (10)
Visitor areas	215 (20)
Warehouses and Storage Rooms/Areas	
– indoor stockroom, active/bulk storage	110 (10)
– indoor stockroom, inactive	55 (5)
– indoor rack storage	270 (25)
– outdoor storage	33 (3)
Work areas – general (not listed above)	325 (30)



## **RST 2 FLD 43A      ANIMALS**

Animals represent hazards because of their poisons or venoms, size and aggressiveness, diseases transmitted, or the insects they may carry.

### **Feral Animals**

Landfills and abandoned buildings often attract stray or abandoned dogs. These animals often become pack-oriented, very aggressive, and represent serious risk of harm to unprotected workers.

Workers entering abandoned buildings should be alert for such animals and avoid approaching them since this may provoke aggressive behavior. Avoidance and protection protocols include watching for animal dens, using good housekeeping, and using repellents.

### **Dangerous Wild Animals**

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This FLD outlines actions that, when properly implemented, should provide a high degree of protection for WESTON employees and wildlife.

See Wildlife Hazard Recognition and Protection Procedure (Attached).

### **Venomous Snakes and Lizards**

#### Venomous Snakes

Venomous snakes are common around the world. The major variables are the likelihood of encounter and the snake that is likely to be encountered. Encounters with snakes may be caused by moving containers, reaching into holes, or just walking through high grass, swampy areas, or rocks. **Do not attempt to catch any snakes.**

Symptom of venomous snake bites:

- Bloody wound discharge, blurred vision, burning, convulsions, diarrhea, dizziness, excessive sweating, fainting, fang marks in the skin, fever, increased thirst, local tissue death, loss of muscle coordination, nausea and vomiting, numbness and tingling, rapid pulse, severe pain, skin discoloration, swelling at the site of the bite, weakness.

Venom from venomous snakes and lizards can be divided into three types of toxins, however, there are some indications that snake venom may have more than one toxin and characteristics may change as a snake ages. The three types of toxins and their effects are:

**Hemotoxins** destroy blood cells and affect the circulatory system. The site of the bite rapidly becomes swollen, discolored, and painful. This is usually accompanied by swelling, discoloration, and pain progressing toward the heart.

**Neurotoxins** affect the nervous system and symptoms vary from foggy vision, dizziness, and other comparatively mild symptoms to rigid or flaccid paralysis, shortness of breath, weakness or paralysis of the lower limbs, double vision, inability to speak or swallow, drooping eyelids, and involuntary tremors of the facial muscles. Death can occur in as little as ten minutes, usually due to abrupt cessation of respiration.

**Myotoxins** destroy cells and cause muscle necrosis.

In the US, with the exception of the coral snakes which tend to have neuron-toxic venom, most venomous snakes have been categorized as having hemotoxic venom (in some areas Mojave rattlesnakes are found to have neuron-toxic venom). There is some indication that some species of rattlesnakes have both hemotoxic and neuron-toxic venom. It is also reported that venom of younger snakes may be more neuron-toxic

There are many highly venomous snakes worldwide, some are deadly and most can be deadly without proper care.

## **Geographical Listing of Venomous Snakes**

Following is a list of poisonous snakes by geographic area. This list is extensive but may not be all inclusive. In planning for work around the world, also contact local agencies to determine whether there may be additional venomous snakes or lizards.

### **North America**

**Copperheads** (Broad-banded, Northern, Osage, Southern, Trans-Pecos)

**Rattlesnakes** Diamondback (eastern and western), Massasauga (eastern and western)

**Cottonmouth or water moccasin** (Eastern)

### **Prevention of Bites**

Key factors to working safely in areas where snakes or lizards may be encountered include:

- Be alert
- Use care when reaching into or moving containers
- Use sticks or long-handled tools when reaching where you cannot see
- Be familiar with the habits and habitats of snakes in the vicinity of an incident or site
- In areas or activities where encounters with snakes are likely, wear sturdy leather or rubber work boots and snake chaps
- Do not attempt to catch snakes unless required and qualified

A snake bite warrants medical attention after administration of proper first-aid procedures. It is important to contact local medical facilities to determine where anti-venoms are located.

## **First-Aid**

1. Keep the person calm. Restrict movement, and keep the affected area below heart level to reduce the flow of venom.
2. Remove any rings or constricting items because the affected area may swell. Create a loose splint to help restrict movement of the area.
3. If the area of the bite begins to swell and change color, the snake was probably venomous.
4. Monitor the person's vital signs -- temperature, pulse, rate of breathing, and blood pressure if possible. If there are signs of shock (such as paleness), lay the person flat, raise the feet about a foot, and cover the person with a blanket.
5. Get medical help immediately.
6. Try to photograph or identify the snake. Do not waste time hunting for the snake, and do not risk another bite. Be careful of the head of a dead snake. A snake can actually bite for up to an hour after it is dead (from a reflex).
  - DO NOT allow the person to become over-exerted. If necessary, carry the person to safety.
  - DO NOT apply a tourniquet.
  - DO NOT apply cold compresses to a snake bite.
  - DO NOT cut into a snake bite with a knife or razor.
  - DO NOT try to suction the venom by mouth.
  - DO NOT give stimulants or pain medications unless instructed to do so by a doctor.
  - DO NOT give the person anything by mouth.
  - DO NOT raise the site of the bite above the level of the person's heart
  - Transport the victim to medical attention immediately

## **Animal Borne Diseases**

### **Rabies**

Animal borne diseases include rabies (generally found in dogs, skunks, raccoons, bats, and foxes). Rabies varies from area to area as do the animals most likely to be rabid.

### **Questions and Answers about Rabies**

*Q. What is Rabies and how is it transmitted?*

A. Rabies is a viral infection most often transmitted by bites of animals infected with the virus.

*Q. What animals are most likely to be infected?*

A. Skunks, raccoons, foxes, and bats are wild animals most frequently found to be infected with rabies; however, any warm blooded animal can be infected. Squirrels, groundhogs, horses, cattle, and rabbits have been tested positive for rabies. Dogs and cats are frequently rabies-infected if not immunized.

*Q. How can you tell if an animal is rabies-infected?*

A. Rabies infection is not always apparent. Signs to look for in wild animals are over-aggressiveness or passivity. Spotting animals which are normally nocturnal (active at night) during the day and being able to approach them would be an example of unusual behavior. Finding a bat alive and on the ground is abnormal. The best precaution, however, is to observe wild animals from a safe distance, even if they are injured. Avoid dogs and cats that you do not know.

*Q. What should you do if bitten by an animal you suspect is infected with rabies?*

A. As quickly as possible, wash the bite area with soap and water, then disinfect with 70% alcohol and seek medical attention for follow-up. Try to capture the animal. Avoid being bitten again or contacting the mouth or any saliva of the animal. Keep the animal under surveillance and call the police for assistance to capture it. Have the animal tested.

A dead animal believed to be infected should be preserved and tested for rabies. Health departments are often sources where information can be found regarding testing.

*Q. Is there a cure for rabies?*

A. Rabies is preventable, even after being bitten, if treatment is begun soon enough. Getting prompt medical attention and confirming the rabies infection of an animal are very important. **Rabies is not curable once symptoms or signs of rabies appear.**

There are vaccines available that should be considered if a work assignment involves trapping animals likely to carry rabies. Medical consultants must be involved in decisions to immunize workers against rabies.

## **Hantavirus**

WESTON employees or contractors/subcontractors conducting field work in areas where there is evidence of a rodent population should be aware of an increased level of concern regarding the transmission of “Hantavirus”-associated diseases. Hantavirus is associated with rodents, especially the deer mouse (*Peromyscus maniculans*) as a primary reservoir host. Hantavirus has resulted in several deaths in the U.S.

The Hantavirus can be transmitted by infected rodents through their saliva, urine, and feces. Human infection may occur when infected wastes are inhaled as a result of aerosols produced directly from the animals. They also may come from dried materials introduced into broken skin or onto mucous membranes. Infections in humans occur most in adults and are associated with

activities that provide contact with infected rodents in rural/semi-rural areas. Hantavirus begins with one or more flu-like symptoms (i.e., fever, muscle aches, headache, and/or cough) and progresses rapidly to severe lung disease. Early diagnosis and treatment are vital.

## **Prevention**

Personnel involved in work areas where rodents and the presence of the Hantavirus are known or suspected will need to take personal protective measures and to develop an expanded site safety plan.

Field personnel involved in trapping or contacting rodents or their waste products will need to wear respirators with high-efficiency particulate air (HEPA) filters, eye protection, Tyvek coveralls, chemical-resistant gloves, and disposable boot covers. Strict decontamination requirements are needed. Double-bag, label, and specific handling, packaging, shipping, storage, and analytical procedures are required to minimize the risks of exposure from collected mice. More detailed procedures can be obtained from WESTON Corporate Health and Safety.

For employees and facilities in rural/semi-rural areas, the following risk-reduction strategies are appropriate:

- Eliminate rodents and reduce availability of food sources and nesting sites used by rodents.
- Store trash/garbage in rodent-proof metal or thick plastic containers with tight lids.
- Cut all grass/underbrush in proximity to buildings.
- Prevent rodents from entering buildings (e.g., use steel wool, screen, etc., to eliminate openings).

## **Plague**

Described under Insects (Fleas)

## **Anthrax**

Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in wild and domestic lower vertebrates (cattle, sheep, goats, and other herbivores), but it can also occur in humans when they are exposed to infected animals or tissue from infected animals.

Anthrax is most common in agricultural regions where it occurs in animals. When anthrax affects humans, it is usually due to an occupational exposure to infected animals or their products. Workers who are exposed to dead animals and animal products from other countries where anthrax is more common may become infected with *B. anthracis* (industrial anthrax). Anthrax in wild livestock has occurred in the U.S.

Anthrax infection can occur in three forms: cutaneous (skin), inhalation, and gastrointestinal. *B. anthracis* spores can live in the soil for many years, and humans can become infected with anthrax by handling products from infected animals or by inhaling anthrax spores from contaminated animal products. Anthrax can also be spread by eating undercooked meat from infected animals. It is rare to find infected animals in the U.S.

**Cutaneous:** Most (about 95%) anthrax infections occur when the bacterium enters a cut or abrasion on the skin, such as when handling contaminated wool, hides, leather, or hair products (especially goat hair) of infected animals. Skin infection begins as a raised itchy bump that resembles an insect bite but within 1-2 days develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the center. Lymph glands in the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax will result in death. Deaths are rare with appropriate antimicrobial therapy.

**Inhalation:** Initial symptoms may resemble a common cold. After several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal.

**Intestinal:** The intestinal disease form of anthrax may follow the consumption of contaminated meat and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhea. Intestinal anthrax results in death in 25% to 60% of cases.

Anthrax is not known to spread from one person to another person. Communicability is not a concern in managing or visiting patients with inhalation anthrax.

## **Prevention**

In countries where anthrax is common and vaccination levels of animal herds are low, humans should avoid contact with livestock and animal products and avoid eating meat that has not been properly slaughtered and cooked. Also, an anthrax vaccine has been licensed for use in humans. The vaccine is reported to be 93% effective in protecting against anthrax.

Doctors can prescribe effective antibiotics. To be effective, treatment should be initiated early. If left untreated, the disease can be fatal.

Direct person-to-person spread of anthrax is extremely unlikely; however, a patient's clothing and body may be contaminated with anthrax spores. Effective decontamination of people can be accomplished by a thorough wash down with anti-microbe effective soap and water. Waste water should be treated with bleach or other anti-microbial agent. Effective decontamination of articles can be accomplished by boiling contaminated articles in water for 30 minutes or longer and using common disinfectants. Chlorine is effective in destroying spores and vegetative cells on surfaces. Burning the clothing is also effective. After decontamination, there is no need to immunize, treat, or isolate contacts of people ill with anthrax unless they also were also exposed to the same source of infection. Early antibiotic treatment of anthrax is essential—delay seriously lessens chances for survival. Treatment for anthrax infection and other bacterial infections

includes large doses of intravenous and oral antibiotics, such as fluoroquinolones, like ciprofloxacin (cipro), doxycycline, erythromycin, vancomycin, or penicillin. In possible cases of inhalation anthrax exposure to unvaccinated personnel, early antibiotic prophylaxis treatment is crucial to prevent possible death.

No skin, especially if it has any wounds or scratches, should be exposed. Disposable personal protective equipment is preferable, but if not available, decontamination can be achieved by washing any exposed equipment in hot water, bleach and detergent. Disposable personal protective equipment and filters should be burned and buried. The size of *Bacillus anthracis* bacilli ranges from 0.5  $\mu\text{m}$  to 5.0  $\mu\text{m}$ . Anyone working with anthrax in a suspected or confirmed victim should wear respiratory equipment capable of filtering this size of particle or smaller. The U.S. National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA) approved high efficiency-respirator, such as a half-face disposable respirator with a HEPA filter, is recommended. All possibly contaminated bedding or clothing should be isolated in double plastic bags and treated as possible bio-hazard waste. Dead victims that are opened and not burned provide an ideal source of anthrax spores; the victim should be sealed in an airtight body bag. Cremating victims is the preferred way of handling body disposal. No embalming or autopsy should be attempted without a fully equipped biohazard lab and trained and knowledgeable personnel.

Delays of only a few days may make the disease untreatable and treatment should be started even without symptoms if possible contamination or exposure is suspected. Animals with anthrax often just die without any apparent symptoms. Initial symptoms may resemble a common cold – sore throat, mild fever, muscle aches and malaise. After a few days, the symptoms may progress to severe breathing problems and shock and ultimately death. Death can occur from about two days to a month after exposure with deaths apparently peaking at about 8 days after exposure. [8] Antibiotic-resistant strains of anthrax are known.

Aerial spores can be trapped by a simple HEPA or P100 filter. Inhalation of anthrax spores can be prevented with a full-face mask using appropriate filtration. Unbroken skin can be decontaminated by washing with simple soap and water. All of these procedures do not kill the spores which are very hard to kill and require extensive treatment to eradicate them. Filters, clothes, etc. exposed to possible anthrax contaminated environments should be treated with chemicals or destroyed by fire to minimize the possibility of spreading the contamination.

In recent years there have been many attempts to develop new drugs against anthrax; but the existing supply still works fine if treatment is started soon enough.

Prevention can also be accomplished through early detection. In response to the U.S. Postal Service (USPS) anthrax attacks of October 2001, the USPS has installed BioDetection Systems (BDS) in their large-scale mail cancellation facilities. BDS response plans have been formulated by the USPS in conjunction with local responders including fire, police, hospitals, and public health. Employees of these facilities have been educated about anthrax, response actions and prophylactic medication. Because of the time delay inherent in getting final verification that anthrax has been used, prophylactic antibiotics for possibly exposed personnel should commence as soon as possible.

The ultimate in prevention is vaccination against infection but this has to be done well in advance of exposure.

Anthrax spores can survive for long periods of time in the environment after release. Methods for cleaning anthrax contaminated sites commonly use oxidizing agents such as peroxides, ethylene Oxide, Sandia Foam, chlorine dioxide (used in the Hart Senate office building), and liquid bleach products containing sodium hypochlorite. These agents slowly destroy bacterial spores. A bleach solution for treating hard surfaces has been approved by the EPA and can be prepared by mixing one part bleach (5.25%-6.00%) to one part white vinegar to eight parts water. Bleach and vinegar must not be combined together directly, rather some water must first be added to the bleach (e.g., two cups water to one cup of bleach), then vinegar (e.g., one cup), and then the rest of the water (e.g., six cups). The pH of the solution should be tested with a paper test strip; and treated surfaces must remain in contact with the bleach solution for 60 minutes (repeated applications will be necessary to keep the surfaces wet).

Chlorine dioxide has emerged as the preferred biocide against anthrax-contaminated sites, having been employed in the treatment of numerous government buildings over the past decade. Its chief drawback is the need for in situ processes to have the reactant on demand.

To speed the process, trace amounts of a non-toxic catalyst composed of iron and tetra-amido macrocyclic ligands are combined with sodium carbonate and bicarbonate and converted into a spray. The spray formula is applied to an infested area and is followed by another spray containing tertiary-butyl hydroperoxide

Using the catalyst method, a complete destruction of all anthrax spores takes 30 minutes. A standard catalyst-free spray destroys fewer than half the spores in the same amount of time. They can be heated, exposed to the harshest chemicals, and they do not easily die.

## **Brucellosis**

Brucellosis, also called undulant fever or Malta fever, is a zoonosis (infectious disease transmitted from animals to humans) caused by bacteria of the genus *Brucella*. It is primarily a disease of domestic animals (goats, pigs, cattle, dogs, etc.) and humans and has a worldwide distribution.

Although brucellosis can be found worldwide, it is more common in countries that do not have good standardized and effective public health and domestic animal health programs. Areas currently listed as high risk include the Caribbean.

The disease is transmitted either through contaminated or untreated milk (and its derivatives) or through direct contact with infected animals, which may include dogs, pigs, camels, and ruminants, primarily sheep, goats, cattle, and bison. This also includes contact with their carcasses.



Leftovers from parturition are also extremely rich in highly virulent brucellae. Brucellae, along with leptospira have the unique property of being able to penetrate through intact human skin, so infection by mere hand contact with infectious material is likely to occur.

The disease is now usually associated with the consumption of un-pasteurized milk and soft cheeses made from the milk of infected animals and with occupational exposure of veterinarians and slaughterhouse workers. Some vaccines used in livestock, most notably *B. abortus* strain 19 also cause disease in humans if accidentally injected. Problems with vaccine induced cases in the United States declined after the release of the RB-51 strain developed in the 1990s and the relaxation of laws requiring vaccination of cattle in many states.

The incubation period of brucellosis is, usually, of one to three weeks, but some rare instances may take several months to surface.

Brucellosis induces inconstant fevers, sweating, weakness, anemia, headaches, depression and muscular and bodily pain.

The symptoms are like those associated with many other febrile diseases, but with emphasis on muscular pain and sweating. The duration of the disease can vary from a few weeks to many months or even years. In first stage of the disease, septicaemia occurs and leads to the classic triad of undulant fevers, sweating (often with characteristic smell, likened to wet hay) and migratory arthralgia and myalgia.

## **Prevention**

The main way of preventing brucellosis is by using fastidious hygiene in producing raw milk products, or by pasteurization of all milk that is to be ingested by human beings, either in its pure form or as a derivate, such as cheese.

Provide protection from skin contact when handling potentially infected animals.

## **Q fever**

**Q fever** is caused by infection with *Coxiella burnetii*. This organism is uncommon but may be found in cattle, sheep, goats and other domestic mammals, including cats and dogs. The infection results from inhalation of contaminated particles in the air, and from contact with the vaginal mucus, milk, feces, urine or semen of infected animals. The incubation period is 9-40 days. It is considered possibly the most infectious disease in the world, as a human being can be infected by a single bacterium.

The most common manifestation is flu-like symptoms with abrupt onset of fever, malaise, profuse perspiration, severe headache, myalgia (muscle pain), joint pain, loss of appetite, upper respiratory problems, dry cough, pleuritic pain, chills, confusion and gastro-intestinal symptoms such as nausea, vomiting and diarrhea. The fever lasts approximately 7-14 days.

During the course, the disease can progress to an atypical pneumonia, which can result in a life threatening acute respiratory distress syndrome (ARDS), whereby such symptoms usually occur during the first 4-5 days of infection.

Less often the Q fever causes (granulomatous) hepatitis which becomes symptomatic with malaise, fever, liver enlargement (hepatomegaly), pain in the right upper quadrant of the abdomen and jaundice (icterus).

The chronic form of the Q fever is virtually identical with the inflammation of the inner lining of the heart (endocarditis), which can occur after months or decades following the infection. It is usually deadly if untreated. However, with appropriate treatment this lethality is around 10%.

The common way of infection is inhalation of contaminated dust, contact with contaminated milk, meat, wool and particularly birthing products. Ticks can transfer the pathogenic agent to other animals. Transfer between humans seems extremely rare and has so far been described in very few cases.

## **Prevention**

Q fever is effectively prevented by intradermal vaccination with a vaccine composed of killed *Coxiella burnetii* organisms. Skin and blood tests should be done before vaccination to identify preexisting immunity; the reason is that vaccinating subjects who already have immunity can result in a severe local reaction. After a single dose of vaccine, protective immunity lasts for many years. Revaccination is not generally required. Annual screening is typically recommended.

Wear appropriate PPE when handling potentially infected animals or materials.

## **Leptospirosis**

Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*.

The time between a person's exposure to a contaminated source and becoming sick is 2 days to 4 weeks. Illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases; after the first phase, with fever, chills, headache, muscle aches, vomiting, or diarrhea, the patient may recover for a time but become ill again. If a second phase occurs, it is more severe; the person may have kidney or liver failure or meningitis. This phase is also called Weil's disease.

The illness lasts from a few days to 3 weeks or longer. Without treatment, recovery may take several months. In rare cases death occurs.

Many of these symptoms can be mistaken for other diseases. Leptospirosis is confirmed by laboratory testing of a blood or urine sample.

*Leptospira* organisms have been found in cattle, pigs, horses, dogs, rodents, and wild animals. Humans become infected through contact with water, food, or soil containing waste from these infected animals. This may happen by consuming contaminated food or water or through skin contact, especially with mucosal surfaces, such as the eyes or nose, or with broken skin. The disease is not known to be spread from person to person.

Leptospirosis occurs worldwide but is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, for example, farmers, sewer workers, veterinarians, fish workers, dairy farmers, or military personnel. It is a recreational hazard for campers or those who participate in outdoor sports in contaminated areas and has been associated with swimming, wading, and whitewater rafting in contaminated lakes and rivers. The incidence is also increasing among urban children.

The risk of acquiring leptospirosis can be greatly reduced by not swimming or wading in water that might be contaminated with animal urine.

Protective clothing or footwear should be worn by those exposed to contaminated water or soil because of their job or recreational activities.

## **Prevention**

Avoid risky foods and drinks.

Buy it bottled or bring it to a rolling boil for 1 minute before drink it. Bottled carbonated water is safer than non-carbonated water.

Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.

Eat foods that have been thoroughly cooked and that are still hot and steaming

Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well. When eating raw fruit or vegetables that can be peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings.

Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the street, and many travelers get sick from food bought from street vendors.

Leptospirosis is treated with antibiotics, such as doxycycline or penicillin, which should be given early in the course of the disease. Intravenous antibiotics may be required for persons with more severe symptoms. Persons with symptoms suggestive of leptospirosis should contact a health care provider.

## **Ebola**

Ebola is both the common term used to describe a group of viruses belonging to genus Ebolavirus, family Filoviridae, and the common name for the disease which they cause, Ebola hemorrhagic fever. Ebola viruses are morphologically similar to the Marburg virus, also in the family Filoviridae, and share similar disease symptoms. Ebola has caused a number of serious and highly publicized outbreaks since its discovery.

Despite considerable effort by the World Health Organization, no animal reservoir capable of sustaining the virus between outbreaks has been identified. However, it has been hypothesized that the most likely candidate is the fruit bat.

Ebola hemorrhagic fever is potentially lethal and encompasses a range of symptoms including fever, vomiting, diarrhea, generalized pain or malaise, and sometimes internal and external bleeding. Mortality rates are extremely high, with the human case-fatality rate ranging from 50% - 89%, according to viral subtype. <sup>[2]</sup> The cause of death is usually due to hypovolemic shock or organ failure.

Because Ebola is potentially lethal and since no approved vaccine or treatment is available, Ebola is classified as a biosafety level 4 agent, as well as a Category A bioterrorism agent by the Centers for Disease Control and Prevention.

Symptoms are varied and often appear suddenly. Initial symptoms include high fever (at least 38.8°C), severe headache, muscle joint, or abdominal pain, severe weakness and exhaustion, sore throat, nausea, and dizziness. Before an outbreak is suspected, these early symptoms are easily mistaken for malaria, typhoid fever, dysentery, influenza, or various bacterial infections, which are all far more common and less reliably fatal.

Ebola may progress to cause more serious symptoms, such as diarrhea, dark or bloody feces, vomiting blood, red eyes due to distention and hemorrhage of sclerotic arterioles, petechia, maculopapular rash, and purpura. Other secondary symptoms include hypotension (less than 90 mm Hg systolic /60 mm Hg diastolic), hypovolemia, tachycardia, organ damage (especially the kidneys, spleen, and liver) as a result of disseminated systemic necrosis, and proteinuria. The interior bleeding is caused by a chemical reaction between the virus and the platelets which creates a chemical that will cut cell sized holes into the capillary walls.

Among humans, the virus is transmitted by direct contact with infected body fluids, or to a lesser extent, skin or mucus membrane contact. The incubation period can be anywhere from 2 to 21 days, but is generally between 5 and 10 days.

Although airborne transmission between monkeys has been demonstrated by an accidental outbreak in a laboratory located in Virginia, USA, there is very limited evidence for human-to-human airborne transmission in any reported epidemics.

The infection of human cases with Ebola virus has been documented through the handling of infected chimpanzees, and gorillas--both dead and alive.

So far, all epidemics of Ebola have occurred in sub-optimal hospital conditions, where practices of basic hygiene and sanitation are often either luxuries or unknown to caretakers and where disposable needles and autoclaves are unavailable or too expensive. In modern hospitals with disposable needles and knowledge of basic hygiene and barrier nursing techniques, Ebola rarely spreads on such a large scale.

## **Prevention**

Prevention methods include good hygiene in medical settings and awareness of the virus in travel areas. There is no known effective vaccine for humans.

Prevention efforts should concentrate on avoiding contact with host or vector species. Travelers should not visit locations where an outbreak is occurring. Contact with rodents should be avoided. Minimize exposure to arthropod bites by using permethrin-impregnated bed nets and insect repellents.

Strict compliance with infection control precautions (i.e., use of disposable gloves, face shields, and disposable gowns to prevent direct contact with body fluids and splashes to mucous membranes when caring for patients or handling clinical specimens; appropriate use and disposal of sharp instruments; hand washing and use of disinfectants) is recommended to avoid health care-associated infections.

Contact with dead primates should be avoided.

## **Bird and Bat Borne or Enhanced Diseases**

**See also under Molds and Fungus**

## **Histoplasmosis**

Histoplasmosis is a fungal infection which enters the body through the lungs. The infection enters the body through the lungs. The fungus grows as a mold in the soil, and infection results from breathing in airborne particles. Soil contaminated with bird or bat droppings are known to have a higher concentration of histoplasmosis.

There may be a short period of active infection, or it can become chronic and spread throughout the body. Most people who do develop symptoms will have a flu-like syndrome (acute-fever, chills cough, and chest pain; chronic-chest pain, cough with blood, fever, shortness of breath, sweating) and lung complaints related to pneumonia or other lung involvement. Approximately 10% of the population will develop inflammation in response to the initial infection. This can affect the skin, bones or joints, or the lining of the heart (pericardium). These symptoms are not due to fungal infection of those body parts, but due to inflammation.

In a small number of patients, histoplasmosis may become widespread (disseminated) and involve the blood, brain, adrenal glands, or other organs. Very young or old are at a higher risk for

disseminated histoplasmosis. Symptoms include fevers, headache, neck stiffness, mouth sores, skin lesions.

Histoplasmosis may be prevented by reducing dust exposure in areas containing bird or bat droppings. Wear PPE and respirator when working within this environment. Institute work practices and dust control measures, i.e. moist/wet area, that eliminate or reduce dust generation which will reduce risks of infection and subsequent development of disease.

## Treatment

The main treatment for histoplasmosis is antifungal drugs. Amphotericin B, itraconazole, and ketoconazole are the usual treatments. Long-term treatment with antifungal drugs may be needed.

## Psittacosis

Psittacosis is a disease caused by a bacteria that is found in bird droppings and other secretions (often carried by pet birds). The bacteria is found worldwide.

Symptoms of psittacosis infection may include a low-grade fever that often becomes worse as the disease progresses, including anorexia, sore throat, light sensitivity, and a severe headache.

Ammonia and sodium hypochlorite based disinfectants are effective disinfectants for Psittacosis.

Where it is necessary to remove bat droppings from buildings prior to renovation or demolition it is prudent to assume infection and use the following precautions:

- Avoid areas that may harbor the bacteria, e.g., accumulations of bird or bat droppings.
- Areas known or suspected of being contaminated by *the organisms causing* Psittacosis such as bird roosts, attics, or even entire buildings that contain accumulations of bat or bird manure, should be posted with signs warning of the health risk. The building or area should be secured
- Before an activity is started that may disturb any material that might be contaminated by Psittacosis, workers should be informed in writing of the personal risk factors that increase an individual's chances of developing these diseases. Such a written communication should include a warning that individuals with weakened immune systems are at the greatest risk of developing severe forms of these diseases become infected. These people should seek advice from their health care provider about whether they should avoid exposure to materials that might be contaminated with these organisms.

The best way to prevent exposure is to avoid situations where material that might be contaminated can become aerosolized and subsequently inhaled. A brief inhalation exposure to

highly contaminated dust may be all that is needed to cause infection and subsequent development of psittacosis. Therefore, work practices and dust control measures that eliminate or reduce dust generation during the removal of bat manure from a building will also reduce risks of infection and subsequent development of disease. For example, instead of shoveling or sweeping dry, dusty material, carefully wetting it with a water spray can reduce the amount of dust aerosolized during an activity. Adding a surfactant or wetting agent to the water might reduce further the amount of aerosolized dust.

Once the material is wetted, it can be collected in double, heavy-duty plastic bags, a 55-gallon drum, or some other secure container for immediate disposal. An alternative method is use of an industrial vacuum cleaner with a high-efficiency filter to *bag* contaminated material. Truck-mounted or trailer-mounted vacuum systems are recommended for buildings with large accumulations of bat or bird manure. These high-volume systems can remove tons of contaminated material in a short period. Using long, large-diameter hoses, such a system can also remove contaminated material located several stories above its waste hopper. This advantage eliminates the risk of dust exposure that can happen when bags tear accidentally or containers break during their transfer to the ground.

The removal of all material that might be contaminated from a building and immediate waste disposal will eliminate any further risk that someone might be exposed to aerosolized spores. Air sampling, surface sampling, or the use of any other method intended to confirm that no infectious agents remain following removal of bat manure is unnecessary in most cases. However, before a removal activity is considered finished, the cleaned area should be inspected visually to ensure that no residual dust or debris remains.

Spraying 1:10 bleach to water mixture on droppings and allowing it to dry is also a recommended practice for the psittacosis organisms.

Because work practices and dust control measures to reduce worker exposures to these organisms have not been fully evaluated, using personal protective equipment is still necessary during some activities. During removal of an accumulation of bat or bird manure from an enclosed area such as an attic, dust control measures should be used, but wearing a NIOSH-approved respirator and other items of personal protective equipment is also recommended to reduce further the risk of exposure to the organisms that cause Psittacosis.

## Treatment

Psittacosis is often hard to diagnoses and while a concern, it does not occur with great frequency. Knowledge of the symptoms and of potential exposure is important when seeking medical follow-up for potential exposure.

There are various medical treatments for psittacosis based on extent of infection. The sooner the disease is diagnosed and treatment is begun the more effective the treatment will be.

## **APPENDIX A**

### **Dangerous Animals - Wildlife Hazard Recognition and Protection**

#### **GENERAL**

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This procedure outlines actions that when properly implemented should provide a high degree of protection for employees and wildlife.

These procedures apply to employees who prepare Health and Safety Plans or perform fieldwork in environments in which wild animals may be encountered. However, due to the unpredictable nature of wild animals this single document cannot possibly cover all potential risks or protective measures. Therefore, prior to entering remote areas inhabited by dangerous wildlife, contact local wildlife agencies to gather additional information concerning local risks and protective measures.

#### **ATTACHMENTS**

Attachments 1 and 2 outline behavioral characteristics of and outline controls that will minimize human injury, loss of property, and unnecessary destruction of wildlife, while ensuring a safe work environment.

#### **WILDLIFE AVOIDANCE AND BASIC PROTECTIVE MEASURES**

The best protective measure is simply avoidance. Large numbers of humans present deterrence to wild animals; therefore, whenever possible teams in the field should work together in groups of four or more. Whenever practical, fieldwork should be scheduled around the seasonal cycles of wildlife in the area. When wild animal avoidance cannot be achieved through scheduling, personnel involved in field activities in which encounters with wild animals may result, will take the following steps and will be equipped and trained, as set forth below.

#### **CLEAR THE AREA**

Evaluate and control the area before entry by

- Determine areas of recent sightings through local Fish and Game, state troopers, etc.;
- Conduct a site observation from an off-site elevated point, if possible;
- Conduct a controlled walk through in the area by a trained observer;
- Arrange a briefing by a local specialist, e. g., Fish and Game, etc.; and
- Utilizing appropriate noisemakers.

#### **BASIC EQUIPMENT**

Employees entering an environment where encounters with wild animals are possible should be provided, as a minimum:

- Noisemakers, such as air horns, bells, etc.; and
- Bear spray of not less than 16-ounce capacity (with holster), equivalent to capsicum pepper (red pepper extract), which is capable of spraying at least 15 feet. (Notes: Normally cannot be transported in side aircraft passenger compartments and may be



considered a hazardous material, check with airlines and hazardous material shippers for current information).

## **TRAINING**

Prior to entering and / or working in areas inhabited by dangerous wildlife each employee should receive training as outlined in this procedure. At a minimum, training must include information related to:

- Wildlife present, habitat, behavior patterns, including when wild animals are most active, etc.
- Warning signs, such as tracks, bedding areas, scat, claw marks, offspring, paths, etc.,
- Avoidance measures
- Other hazards, precautions, and protective measures as outlined in the Attachments,
- (At the jobsite) spray demonstration and safety instructions which include location of and persons designated as “bear watch”

An outline of the training content should be reviewed and approved by the Divisional EHS manager and should be documented. A record of the training will be maintained at the job site, filed with the SSHSP and in the employee’s training records.

## **VEHICLE SAFETY**

Use extreme caution, particularly in darkness, when operating vehicles in areas where wild animals may be present. Collisions with large animals have been known to cause significant property damage and personal injuries to vehicle passengers, including fatalities.

## **ATTACHMENT 1**

### **BEAR SAFETY – HAZARD RECOGNITION AND PRECAUTIONS**

On occasion fieldwork may be conducted in a location where bears may be encountered. The following technical information, precautions, and guidelines for operations in which bears could be encountered are based on experience and conditions for field work. Bears are intelligent, wild animals and are potentially dangerous, and would rather be left alone. The more bears are understood the less they will be feared. This attachment is intended to provide information that will enable Weston to plan for bear encounters and to properly address face-to-face encounters.

### **Bear Life History**

Although bears are creatures of habit, they are also intelligent, and each has its own personality. The way a bear reacts is often dictated by what it has learned from its mother, the experience it has had on its own, and the instincts nature has provided. Like other intelligent animals, we can make general statements about bears, but few people can accurately predict their behavior.

Bears have an incredible sense of smell, and seem to trust it more than any other sense. Hearing and sight are also important, but to a lesser degree. A bear's hearing is probably better than ours, but not as keen as a dog's hearing. Their sight is probably comparable to that of a human. Black bears tend to favor forested habitats.

Bears are opportunists, relying on their intelligence and their senses to find food. They use different habitats throughout the year, depending on the availability of food and other necessities. The area a bear covers in a given year is partially dependent on how far it has to go to satisfy these basic needs. In some areas, individual bears have home ranges of less than a square mile; in other areas ranges can encompass hundreds of square miles. Males usually range over larger areas than females.

In spring, bears begin coming out of hibernation. Males are usually the first bears to emerge, usually in April, and females with new cubs are usually the last, sometimes as late as late June. When bears emerge from their dens, they are lethargic for the first few days, frequently sleeping near their dens and not eating. When they do start eating, they seek carrion (deer, etc.), roots, and emerging vegetation. In coastal areas, beaches become travel corridors as bears seek these foods.

In early summer, bears eat new grasses and forage as they develop in higher elevations. In coastal areas, salmon are the most important food from June through September. This period is one of the few times that bears are found in large groups, and it is the time that most people see bears. Bears often travel, eat, and sleep along streams for weeks at a time.

Other summer foods for bears include grasses and ground squirrels. When bears kill or scavenge large prey, they commonly cover the portions they cannot eat with sticks and duff. A bear may remain near a food cache for days and it will defend it from intruders.

During the late summer and early fall, bears move inland and consume large amounts of blueberries, and other succulent fruits. As the seasons progress towards winter, a bear's diet becomes more varied. This is the time that bears are adding final deposits of fat before their long winter naps.

In October and November, bears move into their denning areas and begin preparing a suitable den. Black bears usually den in holes under large trees or rock outcrops, or in small natural cavities. Dens are just large enough for the bears to squeeze into. Bears rarely eat, drink, urinate, or defecate while they are denning. They sleep deeply, but do not truly hibernate, and they can be awakened by loud noises or disturbances.

Cubs are born in the den, usually in January. Black bear cubs usually stay with their mothers for a year and a half. Black bears are sexually mature at age 2. Mating season is in the spring (May or June) and both species are polygamous (multiple mates). Black bears can live for 25 – 30 years, although most live less than 20 years.

### **BEAR AND HUMAN INTERACTIONS**

Bears generally prefer to be left alone, but they share their homes with other creatures, including humans, who intrude on virtually every aspect of the bear's life. Bears are normally tolerant of these activities and generally find a secure way to avoid them. Humans can help bears make a graceful retreat and avoid many close encounters by letting them know we are coming. Walking in groups, talking, and wearing noise making devices, such as bear bells, all serve to warn a bear of your approach. When possible, avoid hiking and camping in areas where bears are common, such as bear trails through heavy brush or along salmon streams. Always keep an eye out for bears and bear signs. If you happen upon a dead animal, especially one that is covered with sticks and duff (a bear cache), immediately retreat the way you came, but do not run, and make a detour around the area. If you see a cub up a tree or a small bear walking alone, immediately retreat and detour around the area. Like all young animals, cubs wander away from their mothers, but females are furiously protective when they believe their cubs are threatened. Even if we do everything possible to avoid meeting a bear, sometimes bears come to us.

Bears are both intelligent and opportunistic, and they express these qualities through their curiosity. This curiosity frequently brings them into "human habitat." When this happens, we often feel vulnerable, and the bear is sometimes viewed as a threat or nuisance. In most cases, a curious bear will investigate a "human sign," perhaps test it out (chew on a raft, bite into some cans, etc.), and leave, never to return. If the bear was rewarded during his investigation by finding something to eat, it is hard to stop them from returning once they have had a food-reward. That is why we emphasize the importance of keeping human food and garbage away from bears. When in bear country, always think about the way you store, cook, and dispose of your food. **Never feed bears!** This is both illegal and foolish. Food should be stored in airtight containers, preferably away from living and sleeping areas. Garbage should be thoroughly incinerated as soon as possible. Fish and game should be cleaned well away from camp, and clothing that smells of fish and game should be stored away from sleeping areas. Menstruating women should take extra precautions to keep themselves as clean as possible, and soiled tampons and pads should

be treated as another form of organic garbage. Once a bear has obtained food from people, it may continue to frequent areas occupied by people. If a bear does not find food or garbage after the next few tries, it may give up and move back into a more natural feeding pattern. Occasionally, though, the bear will continue to seek human foods and can become a “problem bear.” Some bears become bold enough to raid campsites and break into cabins to search for human food. Shooting bears in the rump with cracker shells, flares, rubber bullets, and birdshot are common methods of “aversive conditioning.” These are also very dangerous techniques, because they may seriously injure a bear if not done properly and/or they may cause a bear to attack the shooter.

## **BLACK BEARS**

Black Bear Identification: Black bears are the smallest and most abundant of the bear species. They are five to six feet long and stand about two to three feet high at the shoulders. They weigh from 200 to 500 pounds. While they are most commonly black, other color phases include brown (cinnamon), and, rarely, gray (blue), and white. Muzzles are usually brown. Black bears can be distinguished from brown bears by:

- Their head shape (a black bear’s nose is straight in profile, a brown bear’s is dished);
- Their claws (black bear’s claws are curved and smaller, brown bears are relatively straight and longer);
- Their body shape (when standing, a black bear’s rump seems to be higher than its shoulders; a brown bear’s shoulders are usually higher than its rump); and

Typical Habitat: Black bears occupy a wide range of habitats, but seem to be most common in forested areas.

## **AVOIDING BEAR ENCOUNTERS WHEN**

- The Bear sees you but you do not know the bear is around: The bear will likely avoid detection people and will simply move away when they sense a human.
- You see a bear and it does not know you are there: Move away slowly. Avoid intercepting the bear if it is walking. If possible, detour around the bear. If the bear is close to you, stand where you are or back away slowly. Do not act threateningly toward the bear, it may know you are there but it has chosen to ignore you as long as you are not a threat.
- You see the bear and the bear sees you: Do not act threateningly, but let the bear know you are human. Wave your arms slowly, talk in a calm voice, and walk away slowly in a lateral direction, keeping an eye on the bear. Unless you are very close to a car or a building, never run from bears. In a bear’s world, when something runs it is an open invitation to chase it. Bears will chase a running object even if they have no previous intention of catching it. Bears can run as fast as a racehorse, so humans have little or no chance of outrunning a bear.
- You see a bear; the bear sees you and stands on its hind legs: This means that the bear is seeking more information. Bears stand on their hind legs to get a better look, or smell, at something they are uncertain of. It is your cue to help it figure

out what you are. Help the bear by waving your arms slowly and talking to it. Standing is not a precursor to an attack. Bears do not attack on their hind legs. It is also important to remember that when a bear goes back down on all fours from a standing position, it may come towards you a few steps. This is normal, and probably not an aggressive act.

- The bear sees you, recognizes you as a human, but continues to come towards you slowly: This may mean several things, depending on the bear and the situation. It may mean that the bear does not see you as a threat, and just wants to get by you (especially if the bear is used to humans, as in a National Park); the bear wants to get food from you (if it has gotten food from people before); the bear wants to test your dominance (it views you as another bear); or may be stalking you as food (more common with black bear, but a rare occurrence). In all cases, your reaction should be to back off the trail very slowly, stand abreast if you are in a group, talk loudly, and/or use a noise-making device. If the bear continues to advance, you should stop. At this point, it is important to give the bear the message that if he continues to advance it will cost him. Continue to make loud noises and present a large visual image to the bear (standing abreast, open your coat). In bear language, bears assert themselves by showing their size. If an adult brown bear continues to come at you, climbing 20 feet or higher up a tree may also be an option if one is next to you (remember, never run from bears). Keep in mind, though, black bears can climb trees.
- The bear recognizes you as a human and acts nervous or aggressive: When bears are nervous or stressed they can be extremely dangerous. This is when it is important to try to understand what is going on in the bears mind. Nervous bears growl, woof, make popping sounds with their teeth, rock back and forth on their front legs, and often stand sideways to their opponent. A universal sign of a nervous bear is excessive salivation (sometimes it looks like they have white lips). When a bear shows any of these signs, stand where you are and talk in a calm voice. Do not try to imitate bear sounds, this may only serve to confuse and further agitate the bear. If you are in a group, stand abreast.
- The bear charges: If all other signals fail, a bear will charge. Surprisingly, most bear charges are just another form of their language. The majority of these are “bluff charges,” that is; the bear stops before making contact with their opponent. There are many different types of bluff charges ranging from a loping uncertain gait to a full-blown charge. If a bear charges, stand still.
- The bear attacks: When all else fails, a bear may attack. Attacks may be preceded by all of the behaviors previously described or they may be sudden. Seemingly unprovoked attacks are often the result of a bear being surprised (and feeling threatened), a bear defending its food cache, or a female defending her cubs. When a bear attacks, it typically runs with its body low to the ground, legs are stiff, ears are flattened, hair on the nape of the neck is up, and the bear moves in a fast, determined way. Front paws are often used to knock the opponent down and jaws are used to subdue it.

### **AFTER A BEAR ENCOUNTER**

Black bears have been known to view humans as prey, and if you struggle with the attacking black bear, it will probably go elsewhere for its meal.

- Bear Sprays: Are easy to carry and use, little risk of permanent damage to bears and humans, effective in many situations. However, using a spray may change a false charge into a real charge, they are ineffective at ranges greater than 20 feet, ineffective in windy conditions, dangerous if accidentally discharged in a closed area such as an aircraft cockpit.

The most effective tool you have against an attacking bear is your brain. Although bears are intelligent animals, we are smarter and can often think our way out of a bad situation if we try.

## **ATTACHMENT 2**

### **HAZARDS AND PRECAUTIONS – DEER**

The following technical information, precautions, and guidelines for operations in which Deer may be encountered. The more the species are understood, the easier it will be to avoid contact with them thus preventing injury to ourselves and to the animals. All big game species are unpredictable and can be dangerous under certain conditions. This attachment is intended to provide information that will enable Weston to plan for encounters and to properly address face-to-face encounters.

### **WHITE-TAILED DEER**

The White-tailed deer found throughout the eastern and western part of the United States have been known to attack people on many occasions. It is unknown whether Black-tailed deer have made any such attacks, but it is possible for someone to be injured by an irate buck in the breeding season (late fall). Deer are well equipped to injure humans. They are very fast. Bucks have sharp antlers and can clear amazingly high obstacles with graceful, arching leaps. They can run with remarkable speed, even in dense cover, and have excellent camouflage. When working in areas populated with deer, it is just common sense not to approach any large wild animal too closely. It is unlikely that an attack from a deer would be fatal but it is possible and serious injury is likely.

## APPENDIX B - PICTURES OF POISONOUS SNAKES AND LIZARDS

### Americas



American copperhead



Cotton Mouth – East and Southeast US





Timber Rattlesnake – Eastern US



## **FLD 43 B     INSECTS**

### **Sting and Biting Insects**

Contact with stinging insects may result in site personnel experiencing adverse health affects that range from being mildly uncomfortable to being life threatening. Therefore, stinging insects present a serious hazard to site personnel and extreme caution must be exercised whenever site and weather conditions increase the risk of encountering stinging insects. These include the following:

- Bees (Honeybees, bumble bees, wasps, and hornets and wingless wasps)
- Scorpions
- Fire ants
- Spiders
- Ticks
- Deer Flies
- Mosquito
- Fleas
- Bed Bugs

### **Bees, Wasps, Hornets and Yellow Jackets**

The severity of an insect sting reaction varies from person to person. A normal reaction will result in pain, swelling and redness confined to the sting site. Simply disinfect the area (washing with soap and water will do) and apply ice to reduce the swelling.

A large local reaction will result in swelling that extends beyond the sting site. For example, a sting on the forearm could result in the entire arm swelling twice its normal size.

Although alarming in appearance, this condition is often treated the same as a normal reaction. An unusually painful or very large local reaction may need medical attention. Because this condition may persist for two to three days, antihistamines and corticosteroids are sometimes prescribed to lessen the discomfort.

Yellow jackets, hornets and wasps can sting repeatedly. Honeybees have barbed stingers that are left behind in their victim's skin. These stingers are best removed by a scraping action, rather than a pulling motion, which may actually squeeze more venom into the skin.

### **Scorpions (Caribbean)**

Scorpion stings are a major public health problem in many underdeveloped tropical countries. For every person killed by a poisonous snake, 10 are killed by a poisonous scorpion. In the United States, only 4 deaths in 11 years have occurred as a result of scorpion stings. Furthermore, scorpions can be found outside their normal range of distribution, ie, when they

accidentally crawl into luggage, boxes, containers, or shoes and are unwittingly transported home via human travelers.

Out of 1,500 scorpion species, 50 are dangerous to humans. Scorpion stings cause a wide range of conditions, from severe local skin reactions to neurologic, respiratory, and cardiovascular collapse.

Almost all of these lethal scorpions belong to the scorpion family called the Buthidae. The Buthidae are small to mid-size scorpions (0.8 inch to 5.0 inches) and normally uniformly colored without patterns or shapes. Poisonous scorpions also tend to have weak-looking pincers, thin bodies, and thick tails, as opposed to the strong heavy pincers, thick bodies, and thin tails seen in nonlethal scorpions. The lethal members of the Buthidae family include the genera of *Tityus* which can be found in the Caribbean.

A scorpion has a flattened elongated body and can easily hide in cracks. Scorpions are members of the Arachnid (spider) family. The bodies consist of 3-segments, they also have 4 pairs of legs, a pair of claws, and a segmented tail that has a poisonous spike at the end. Scorpions vary in size from 1-20 cm in length.

However, scorpions may be found outside their habitat range of distribution when inadvertently transported with luggage and cargo.

## **Prevention**

Preventive measures include awareness of scorpions, shaking out clothing and boots before putting them on looking before reaching into likely hiding places and wearing gloves, long sleeved shirts and pants.

## **Symptoms**

In mild cases, the only symptom may be a mild tingling or burning at site of sting.

In severe cases, symptoms may include:

- Eyes and ears - Double vision
- Lungs - Difficulty breathing, No breathing, Rapid breathing,
- Nose, mouth, and throat – Drooling, Spasm of the voice box, Thick-feeling tongue
- Heart and blood - High blood pressure, Increased or decreased heart rate, Irregular heartbeat
- Kidneys and bladder Urinary incontinence, Urine output, decreased
- Muscles and joints - Muscle spasms
- Nervous system – Paralysis, Random movements of head, eye, or neck, Restlessness, Seizures, Stiffness
- Stomach and intestinal tract - Abdominal cramps, Fecal incontinence
- Other -Convulsions

## **Treatment**

1. Recognize scorpion sting symptoms:
2. Wash the area with soap and water.
3. Apply a cool compress on the area of the scorpion sting. Ice (wrapped in a washcloth or other suitable covering) may be applied to the sting location for 10 minutes. Remove compress for 10 minutes and repeat as necessary.
4. Call the Poison Control Center. If you develop symptoms of a poisonous scorpion sting, go to the nearest emergency care facility.
5. Keep your tetanus shots and boosters current.

## **Fire Ants (Caribbean)**

Fire ants are aggressive, reddish-brown to black ants that are 1/8 inch to 1/4 inch long. They construct nests, which are often visible as dome-shaped mounds of soil, sometimes as large as 3 feet across and 1 1/2 feet in height. In sandy soils, mounds are flatter and less visible. Fire ants usually build mounds in sunny, open areas such as lawns, pastures, cultivated fields and meadows, but they are not restricted to these areas. Mounds or nests may be located in rotting logs, around trees and stumps, under pavement and buildings, and occasionally indoors.

Fire ants use their stingers to immobilize or kill prey and to defend ant mounds from disturbance by larger animals, such as humans. Any disturbance sends hundreds of workers out to attack anything that moves. The ant grabs its victim with its mandibles (mouthparts) and then inserts its stinger. The process of stinging releases a chemical, which alerts other ants, inducing them to sting. In addition, one ant can sting several times without letting go with its mandibles.

Once stung, humans experience a sharp pain that lasts a couple of minutes, then after a while the sting starts itching and a welt appears. Fire ant venom contains alkaloids and a relatively small amount of protein. The alkaloids kill skin cells; this attracts white blood cells, which form a pustule within a few hours of being stung. The fluid in the pustule is sterile, but if the pustule is broken, the wound may become infected. The protein in the venom can cause allergic reactions that may require medical attention.

Some of the factors related to stinging insects that increase the risk associated with accidental contact are:

- The nests for these insects are frequently found in remote wooded or grassy areas and hidden in cavities
- The nests can be situated in trees, rocks, bushes or in the ground, and are usually difficult to see
- Accidental contact with these insects is highly probable, especially during warm weather conditions when the insects are most active
- If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling which can leave the worker incapacitated and in need of medical attention

- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock
- Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth and respiratory passages
- The hypersensitivity needed to cause anaphylactic shock, can in some people, accumulate over time and exposure, therefore, even if someone has been stung previously, and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again

With these things in mind, and with the high probability of contact with stinging insects, use the following safe work practices:

- If a worker knows that he is hypersensitive to bee, wasp or hornet stings, inform the site Safety officer of this condition prior to participation in site activities
- All site personnel will be watchful for the presence of stinging insects and their nests, and will advise the Site Safety officer if a stinging insect nest is located or suspected in the area
- Any nests located on site will be flagged off and site personnel will be notified of its presence
- If attacked, site personnel will immediately seek shelter and stay there. Do not jump in water (bees will still be in the area when you come up). Once safe, remove stings from your skin, it does not matter how you do it, but do it as quickly as possible to reduce the amount of venom they inject. Obtain first aid treatment and contact the safety officer who will observe for signs of allergic reaction

Treatment for fire ant stings is aimed at preventing secondary bacterial infection, which may occur if the pustule is scratched or broken. Clean the blisters with soap and water to prevent secondary infection. Do not break the blister. Topical corticosteroid ointments and oral antihistamines may relieve the itching associated with these reactions.

Site personnel with a known hypersensitivity to stinging insects will keep required emergency medication on or near their person at all times

## Spiders

A large variety of spiders may be encountered during site activities. Extreme caution must be used when lifting logs and debris, since spiders are typically found in these areas.

While most spider bites merely cause localized pain, swelling, reddening, and in some cases, tissue damage, there are a few spiders that, due to the severity of the physiological affects caused by their venom, are dangerous.

**Black Widow:** The black widow is a coal-black bulbous spider 3/4 to 1 1/2 inches in length, with a bright red hourglass on the under side of the abdomen. The black widow is usually found in dark moist locations, especially under rocks, rotting logs and may even be found in outdoor toilets where they inhabit the underside of the seat. Victims of a black widow bite may exhibit the following signs or symptoms:

- Sensation of pinprick or minor burning at the time of the bite
- Appearance of small punctures (but sometimes none are visible)
- After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils and generalized swelling of face and extremities

**Brown Recluse:** The brown or violin spider is brownish to tan in color, rather flat, and 1/2 to 5/8 inches long. However, unlike the typical species, this spider has been encountered without a violin or “fiddle” shaped mark on the top of the head. Of the brown spider, there are three varieties found in the United States that present a problem to site personnel. These are the brown recluse, the desert violin and the Arizona violin. These spiders may be found in a variety of locations including trees, rocks or in dark locations. Victims of a brown or violin spider bite may exhibit the following signs or symptoms:

- Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite
- Formation of a large, red, swollen, postulating lesion with a bull's-eye appearance
- Systemic affects may include a generalized rash, joint pain, chills, fever, nausea and vomiting
- Pain may become severe after 8 hours, with the onset of tissue necrosis

There is no effective first aid treatment for either of these bites. Except for very young, very old or weak victims, spider bites are not considered to be life threatening. However, medical treatment must be sought to reduce the extent of damage caused by the injected toxins.

#### **Brown Recluse Spider**



#### **Black Widow Spider**



First aid should include:

- If possible, catch the spider to confirm its identity. Even if the body is crushed, save it for identification
- Clean the bitten area with soap and water or rubbing alcohol
- To relieve pain, place an ice pack over the bite
- Keep the victim quiet and monitor breathing

Seek immediate medical attention

### **Sensitivity Reaction to Insect Stings or Bites**

A sensitivity reaction is one of the more dangerous and acute effects of insect bites or stings. It is the most common cause of fatalities from bites, particularly from bees, wasps, and spiders. Anaphylactic shock due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous system. This can also result in death.

Site personnel must be questioned regarding their allergic reaction to insect bites. Anyone knowingly allergic should be required to carry and know how to use a response kit (e.g., Epi-Kit). First aid providers must be instructed on how to use the kit also. The kit must be inspected to ensure it is updated.

Administer first aid and observe persons reporting stings for signs of allergic reaction, such as unusual swelling, nausea, dizziness, and shock. At the first sign of these symptoms, take the individual to a medical facility for attention.

### **Insect Borne Diseases**

Diseases that are spread by insects include the following: Lyme Disease (tick); Bubonic and other forms of Plague (fleas); Malaria, West Nile Virus and Equine Encephalitis (mosquito).

### **Tick Borne Diseases**

Lyme disease is the second most rapidly spreading disease in the U.S.

### **Lyme Disease**

#### **1. Facts**

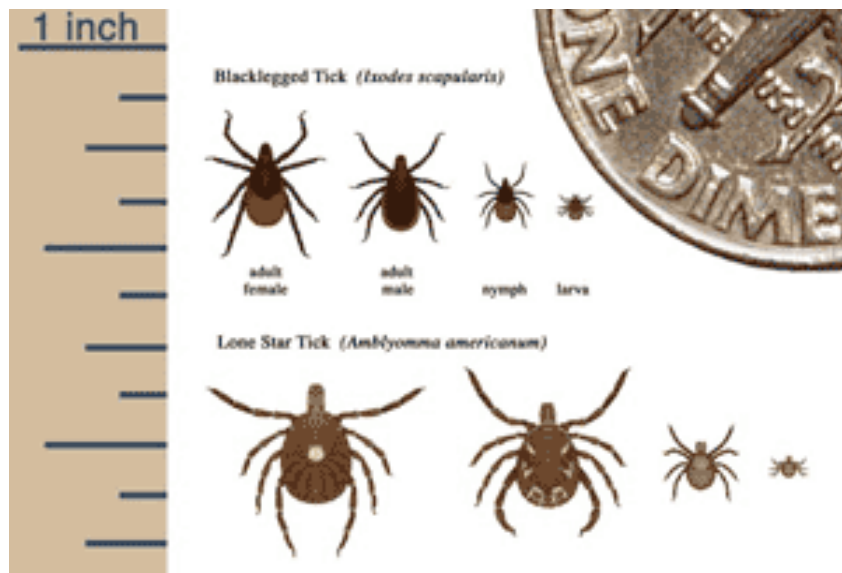
Definition:

- Bacterial infection transmitted by the bite of an infected black-legged tick more popularly known as the deer tick.
- Prevalence (nationwide and other countries).
- Three stages/sizes of deer ticks:
  - Larvae
  - Nymph
  - Adult

Tick season is May through October.

Not all ticks transmit Lyme disease (Black legged or deer tick [upper] compared to the Lone Star tick [lower])





- Ticks must be attached for several hours before Lyme disease can be transmitted.
- Being bitten by a tick does not mean you will get Lyme disease.

## 2. Prevention and Protection:

- Wear light-colored, tight-knit clothing.
- Wear long pants and long-sleeved shirts.
- Tuck pant legs into shoes or boots.
- Wear a hat.
- Use insect repellent containing DEET ((follow manufacturer's instructions for use).
- Check yourself daily for ticks after being in grassy, wooded areas.
- Request information from the Health and Safety Medical Section regarding Lyme Disease.

## 3. If Bitten:

- Remove the tick immediately with fine-tipped tweezers. Grasp the tick as close to the skin as possible. Pull gently but firmly without twisting or crushing the tick.
- Wash your hands and dab the bite with an antiseptic.

- Save the tick in a jar in some alcohol. Label the jar with the date of the bite, the area where you picked up the tick and the spot on your body where you were bitten.
- Monitor the bite for any signs of infection or rash.

#### 4. Symptoms:

Early Signs (may vary from person to person)

- Expanding skin rash.
- Flu-like symptoms during summer or early fall that include the following:
  - Chills, fever, headache, swollen lymph nodes.
  - Stiff neck, aching joints, and muscles.
  - Fatigue.
- Later signs
  - Nervous system problems.
  - Heart problems.
  - Arthritis, especially in knees.

#### 5. Upon Onset of Symptoms:

- Notify your Safety Officer (SO) and your supervisor.

### **Ehrlichiosis**

Ehrlichiosis is the general name used to describe several bacterial diseases that affect animals and humans. These diseases are caused by the organisms in the genus *Ehrlichia*. Worldwide, there are currently four ehrlichial species that are known to cause disease in humans.

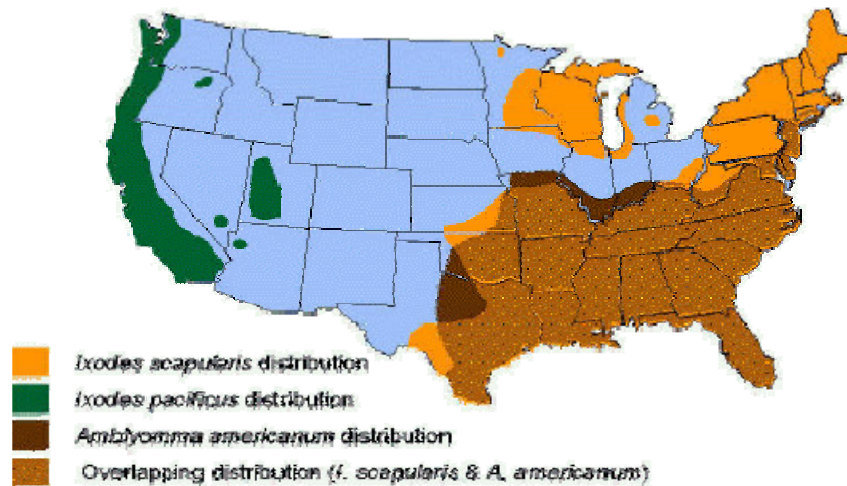
In the United States, ehrlichiae are transmitted by the bite of an infected tick. The lone star tick (*Amblyomma americanum*) and the blacklegged tick (*Ixodes scapularis*) are known vectors of ehrlichiosis.

The symptoms of ehrlichiosis may resemble symptoms of various other infectious and non-infectious diseases. These clinical features generally include fever, headache, fatigue, and muscle aches. Other signs and symptoms may include nausea, vomiting, diarrhea, cough, joint pains, confusion, and occasionally rash. Symptoms typically appear after an incubation period of 5-10 days following the tick bite. It is possible that many individuals who become infected with ehrlichiae do not become ill or they develop only very mild symptoms.

Most cases of ehrlichiosis are reported within the geographic distribution of the vector ticks (see map below). Occasionally, cases are reported from areas outside the distribution of the tick vector. In most instances, these cases have involved persons who traveled to areas where the diseases are endemic, and who had been bitten by an infected tick and developed symptoms after

returning home. Therefore, if you traveled to an ehrlichiosis-endemic area 2 weeks prior to becoming ill, you should tell your doctor where you traveled.

**Figure 20. Areas where human ehrlichiosis may occur based on approximate distribution of vector tick species**



A diagnosis of ehrlichiosis is based on a combination of clinical signs and symptoms and confirmatory laboratory tests. Blood samples can be sent to a reference laboratory for testing. However, the availability of the different types of laboratory tests varies considerably. Other laboratory findings indicative of ehrlichiosis include low white blood cell count, low platelet count, and elevated liver enzymes.

Ehrlichiosis is treated with a tetracycline antibiotic, usually doxycycline.

Very little is known about immunity to ehrlichial infections. Although it has been proposed that infection with ehrlichiae confers long-term protection against reinfection, there have been occasional reports of laboratory-confirmed reinfection. Short-term protection has been described in animals infected with some *Ehrlichia* species and this protection wanes after about 1 year. Clearly, more studies are needed to determine the extent and duration of protection against reinfection in humans.

Limiting exposure to ticks reduces the likelihood of infection in persons exposed to tick-infested habitats. Prompt careful inspection of your body and removal of crawling or attached ticks is an important method of preventing disease. It may take 24–48 hours of attachment before microorganisms are transmitted from the tick to you.

### **Preventive measures - Follow protection protocols for Lyme disease**

#### **Babesiosis**

Babesiosis is an intraerythrocytic parasitic infection caused by protozoa of the genus *Babesia* and transmitted through the bite of the *Ixodes* tick, the same vector responsible for transmission of Lyme disease. While most cases are tick-borne, transfusion and transplacental transmission

have been reported. In the United States, babesiosis is usually an asymptomatic infection in healthy individuals. Several groups of patients become symptomatic, and, within these subpopulations, significant morbidity and mortality occur. The disease most severely affects patients who are elderly, immunocompromised, or asplenic. Among those symptomatically infected, the mortality rate is 10% in the United States.

The primary vectors of the parasite are ticks of the genus *Ixodes*. In the United States, the black-legged tick, *Ixodes scapularis* (also known as *Ixodes dammini*) is the primary vector for the parasite. The *Ixodes* tick vector for *Babesia* is the same vector that locally transmits *Borrelia burgdorferi*, the agent implicated in Lyme disease. The primary US animal reservoir is the white-footed mouse, *Peromyscus leucopus*. Additionally, white-tailed deer serve as transport hosts for the adult tick vector, *I. scapularis*.

The Ixodid ticks ingest *Babesia* during feeding from the host, multiply the protozoa in their gut wall, and concentrate it in their salivary glands. The tick inoculates a new host when feeding again. The parasite then infects red blood cells (RBCs) and differentiated and undifferentiated trophozoites are produced. The former produce 2-4 merozoites that disrupt the RBC and go on to invade other RBCs. This leads to hemolytic anemia, thrombocytopenia, and atypical lymphocyte formation. Alterations in RBC membranes cause decreased conformability and increased red cell adherence, which can lead to development of acute respiratory distress syndrome (ARDS) among those severely affected.

The signs and symptoms mimic malaria and range in severity from asymptomatic to septic shock.

Symptoms include: Generalized weakness, fatigue, depression, fever, anorexia and weight loss, CNS - Headache, photophobia, neck stiffness, altered sensorium, pulmonary - Cough, shortness of breath, GI - Nausea, vomiting, abdominal pain, Musculoskeletal - Arthralgia and myalgia and Renal - Dark urine

## **Prevention**

Prevention measures are the same as for Lyme and other insect borne diseases

## **Tularemia**

**Tularemia** (also known as "rabbit fever") is a serious infectious disease caused by the bacterium *Francisella tularensis*. The disease is endemic in North America. The primary vectors are ticks and deer flies, but the disease can also be spread through other arthropods. Animals such as rabbits, prairie dogs, hares and muskrats serve as reservoir hosts.

Depending on the site of infection, tularemia has six characteristic clinical syndromes: ulceroglandular, glandular, oropharyngeal, pneumonic, oculoglandular, and typhoidal.

The disease has a very rapid onset, with headache, fatigue, dizziness, muscle pains, loss of appetite and nausea. Face and eyes redden and become inflamed. Inflammation spreads to the

lymph nodes, which enlarge and may suppurate (mimicking bubonic plague). Lymph node involvement is accompanied by a high fever. Death may result.

*Francisella tularensis* is one of the most infective bacteria known; fewer than ten organisms can cause disease leading to severe illness. The bacteria penetrate into the body through damaged skin and mucous membranes, or through inhalation. Humans are most often infected by tick bite or through handling an infected animal. Ingesting infected water, soil, or food can also cause infection. Tularemia can also be acquired by inhalation; hunters are at a higher risk for this disease because of the potential of inhaling the bacteria during the skinning process. Tularemia is not spread directly from person to person.

No vaccine is available to the general public. The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellent to prevent tick bites.

### **Prevention**

No vaccine is available to the general public. The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellent to prevent tick bites.

### **Other diseases primarily transmitted by Arthropods (Ticks, mites, lice etc.)**

**Typhus** (Not to be confused with Typhoid Fever [discussed in these FLDs])

*For the unrelated disease caused by *Salmonella typhi*, see Typhoid fever. For the unrelated disease caused by *Salmonella paratyphi*, please refer to Paratyphoid fever. For the monster of Greek mythology, see Typhus (monster).*

**Typhus** is any one of several similar diseases caused by louse-borne bacteria. The name comes from the Greek *typhos*, meaning smoky or lazy, describing the state of mind of those affected with typhus. *Rickettsia* is endemic in rodent hosts, including mice and rats, and spreads to humans through mites, fleas and body lice. The arthropod vector flourishes under conditions of poor hygiene, such as those found in prisons or refugee camps, amongst the homeless, or until the middle of the 20th century, in armies in the field. In tropical countries, typhus is often mistaken for dengue fever.

### **Endemic typhu**

Endemic typhus (also called "flea-borne typhus" and "murine typhus" or "rat flea typhus") is caused by the bacteria *Rickettsia typhi*, and is transmitted by the flea that infest rats. Symptoms of endemic typhus include headache, fever, chills, myalgia, nausea, vomiting, and cough.

Endemic typhus is highly treatable with antibiotics. Most people recover fully, but death may occur in the elderly, severely disabled or patients with a depressed immune system.

## **Encephalitis Arboviral Encephalitides**

### **Perspectives**

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the *Togaviridae* (genus Alphavirus, *Flaviviridae*, and *Bunyaviridae*).

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).

Arboviral encephalitides have a global distribution, but there are four main virus agents of encephalitis in the United States, all of which are transmitted by mosquitoes. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

**There is expanded discussion of several of these diseases (West Nile and Eastern Equine Encephalitis elsewhere in this document. A more general discussion is found in Attachment 2.**

## Mosquito Borne Diseases

### Malaria

**Malaria** is a mosquito-borne disease caused by a parasite. Four kinds of malaria parasites can infect humans: *Plasmodium falciparum*, *P. vivax*, *P. ovale*, and *P. malariae*.



People with malaria often experience fever, chills, and flu-like illness. Left untreated, they may develop severe complications and die. Each year 350-500 million cases of malaria occur worldwide. Infection with any of the malaria species can make a person feel very ill; infection with *P. falciparum*, if not promptly treated, may be fatal. Although malaria can be a fatal disease, illness and death from malaria are largely preventable.

This sometimes fatal disease can be prevented and cured. Bed nets, insecticides, and anti-malarial drugs are effective tools to fight malaria in areas where it is transmitted. Travelers to a malaria-risk area should avoid mosquito bites and take a preventive anti-malarial drug. Malaria was eradicated from the United States in the early 1950s. However, malaria is common in many developing countries and travelers who visit these areas risk getting malaria.

Returning travelers and arriving immigrants could also reintroduce the disease in the United States if they are infected with malaria when they return. The mosquito that transmits malaria, *Anopheles*, is found throughout much of the United States. If local mosquitoes bite an infected person, those mosquitoes can, in turn, infect local residents (*introduced malaria*).

Because the malaria parasite is found in red blood cells, malaria can also be transmitted through blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood. Malaria may also be transmitted from a mother to her fetus before or during delivery ("congenital" malaria).

Malaria is not transmitted from person to person like a cold or the flu. You cannot get malaria from casual contact with malaria-infected people.

## **Prevention and control**

You can prevent malaria by:

- keeping mosquitoes from biting you, especially at night
- taking anti-malarial drugs to kill the parasites
- eliminating places where mosquitoes breed
- spraying insecticides on walls to kill adult mosquitoes that come inside
- sleeping under bed nets - especially effective if they have been treated with insecticide,
- wearing insect repellent and long-sleeved clothing if out of doors at night

The surest way for you and your health-care provider to know whether you have malaria is to have a diagnostic test where a drop of your blood is examined under the microscope for the presence of malaria parasites. If you are sick and there is any suspicion of malaria (for example, if you have recently traveled in a malaria-risk area) the test should be performed without delay.

The disease should be treated early in its course, before it becomes severe and poses a risk to the patient's life. Several good anti-malarial drugs are available, and should be administered early on. The most important step is to think about malaria, so that the disease is diagnosed and treated in time.

## **West Nile Virus**

West Nile virus (WNV) is a potentially serious illness. Experts believe WNV is established as a seasonal epidemic in North America that flares up in the summer and continues into the fall. This fact sheet contains important information that can help you recognize and prevent WNV.

The easiest and best way to avoid WNV is to prevent mosquito bites.

- When you are outdoors, use insect repellent containing an EPA-registered active ingredient. Follow the directions on the package.
- Many mosquitoes are most active at dusk and dawn. Be sure to use insect repellent and wear long sleeves and pants at these times or consider staying indoors during these hours.
- Make sure you have good screens on your windows and doors to keep mosquitoes out.
- Get rid of mosquito breeding sites by emptying standing water from buckets, barrels and drainage ditches.

About one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.



Up to 20 percent of the people who become infected have symptoms such as fever, headache, and body aches, nausea, vomiting, and sometimes swollen lymph glands or a skin rash on the chest, stomach and back. Symptoms can last for as short as a few days, though even healthy people have become sick for several weeks.

Approximately 80 percent of people (about 4 out of 5) who are infected with WNV will not show any symptoms at all. Most often, WNV is spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then spread WNV to humans and other animals when they bite.

In a very small number of cases, WNV also has been spread through blood transfusions, organ transplants, breastfeeding and even during pregnancy from mother to baby.

WNV is not spread through casual contact such as touching or kissing a person with the virus.

Symptoms typically develop between 3 - 14 days after being bitten by an infected mosquito.

There is no specific treatment for WNV infection. In cases with milder symptoms, people experience symptoms such as fever and aches that pass on their own, although even healthy people have become sick for several weeks. In more severe cases, people usually need to go to the hospital where they can receive supportive treatment including intravenous fluids, help with breathing and nursing care.

Milder WNV illness improves on its own, and people do not necessarily need to seek medical attention for this infection though they may choose to do so. If you develop symptoms of severe WNV illness, such as unusually severe headaches or confusion, seek medical attention immediately. Severe WNV illness usually requires hospitalization. Pregnant women and nursing mothers are encouraged to talk to their doctor if they develop symptoms that could be WNV. People over the age of 50 are more likely to develop serious symptoms of WNV if they do get sick and should take special care to avoid mosquito bites.

The more time you're outdoors, the more time you could be bitten by an infected mosquito. Pay attention to avoiding mosquito bites if you spend a lot of time outside, either working or playing.

All donated blood is checked for WNV before being used. The risk of getting WNV through blood transfusions and organ transplants is very small, and should not prevent people who need surgery from having it. If you have concerns, talk to your doctor.

## **Equine Encephalitis**

Eastern equine encephalitis (EEE) is a mosquito-borne viral disease. EEE virus (EEEV) occurs in the eastern half of the United States where it causes disease in humans, horses, and some bird species. Because of the high mortality rate, EEE is regarded as one of the most serious mosquito-borne diseases in the United States.

EEEV is transmitted to humans through the bite of an infected mosquito. It generally takes from 3 to 10 days to develop symptoms of EEE after being bitten by an infected mosquito. The main EEEV transmission cycle is between birds and mosquitoes.

Many species of mosquitoes can become infected with EEEV. The most important mosquito species in maintaining the bird-mosquito transmission cycle is *Culiseta melanura*, which reproduces in freshwater hardwood swamps. *Culiseta melanura*, however, is not considered to be an important vector of EEEV to horses or humans because it feeds almost exclusively on birds.

Transmission to horses or humans requires mosquito species capable of creating a “bridge” between infected birds and uninfected mammals such as some *Aedes*, *Coquillettidia*, and *Culex* species.

Horses are susceptible to EEE and some cases are fatal. EEEV infections in horses, however, are not a significant risk factor for human infection because horses are considered to be “dead-end” hosts for the virus (i.e., the amount of EEEV in their bloodstreams is usually insufficient to infect mosquitoes).

Eastern equine encephalitis virus is a member of the family Togaviridae, genus *Alphavirus* closely related to Western equine encephalitis virus and Venezuelan equine encephalitis virus

Many persons infected with EEEV have no apparent illness. In those persons who do develop illness, symptoms range from mild flu-like illness to inflammation of the brain, coma and death.

The mortality rate from EEE is approximately one-third, making it one of the most deadly mosquito-borne diseases in the United States.

There is no specific treatment for EEE; optimal medical care includes hospitalization and supportive care (for example, expert nursing care, respiratory support, prevention of secondary bacterial infections, and physical therapy, depending on the situation).

Approximately half of those persons who survive EEE will have mild to severe permanent neurologic damage.

Incidence rate includes:

- Approximately 220 confirmed cases in the US 1964-2004, Average of 5 cases/year, with a range from 0-15 cases
- States with largest number of cases includes New Jersey.
- EEEV transmission is most common in and around freshwater hardwood swamps in the Atlantic Coast states and the Great Lakes region.

- Human cases occur relatively infrequently, largely because the primary transmission cycle takes place in and around swampy areas where human populations tend to be limited.

### **Risk Groups:**

- Residents of and visitors to endemic areas (areas with an established presence of the virus)
- People who engage in outdoor work and recreational activities in endemic areas.
- Persons over age 50 and younger than age 15 seem to be at greatest risk for developing severe EEE when infected with the virus.

### **Prevention**

- A vaccine is available to protect equines.
- People should avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers' instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active (some bridge vectors of EEEV are aggressive day-biters), and removing standing water that can provide mosquito breeding sites.
- There are laboratory tests to diagnosis EEEV infection including serology, especially IgM testing of serum and cerebrospinal fluid (CSF), and neutralizing antibody testing of acute- and convalescent-phase serum.

### **Meningitis**

Meningitis is a viral disease that can affect the central nervous system that is transmitted through the bite from an infected mosquito.

Symptoms can be nonexistent or severe and flu-like, with fever, chills, tiredness, headache, nausea and vomiting. If not treated promptly the disease can be fatal.

### **Prevention**

- A vaccine is available. It's 80% effective after a single dose and 97.5% effective after a second dose.

Use precautions as for other mosquito borne diseases. Avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers' instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active and removing standing water that can provide mosquito breeding sites.

### **Deer Flies (See Tularemia above)**

## **Fleas**

Flea is a common name for insects of the order Siphonaptera which are wingless insects with mouthparts adapted for piercing skin and sucking blood. Fleas are external parasites, living by hematophagy off the blood of mammals (including humans). Some species include the cat flea (*Ctenocephalides felis*), dog flea (*Ctenocephalides canis*), and human flea (*Pulex irritans*).

Fleas are small (1.5 to 3.3 mm) long, agile, dark-colored, wingless insect with tube-like mouth parts adapted to feeding on the blood of their hosts. Their legs are long, with the hind pair well adapted for jumping. A flea can jump vertically up to seven inches and horizontally up to 13 inches. The flea body is hard, polished, and covered with many hairs and short spines directed backwards which assists its movement on the host. The body is able to withstand great pressure. Hard squeezing between the fingers is not normally sufficient to kill a flea.

Fleas lay tiny white oval-shaped eggs. The larva is small, pale, has bristles covering its worm-like body, lacks eyes, and has mouthparts adapted to chewing.

Fleas can cause medical problems include flea allergy dermatitis, secondary skin irritations and, in extreme cases, anemia, tapeworms, and stomach flu. Fleas can transmit murine typhus (endemic typhus) fever among animals and from animal to humans. Fleas can also transmit bubonic plague. Tapeworms normally infest in human severe cases. Although the bite is rarely felt, it is the resulting irritation caused by the flea salivary secretions that varies among individuals. Some result in a severe reaction including a general rash or inflammation resulting in secondary infections caused by scratching the irritated skin. Most bites are found on the feet and legs with the formation of small, hard, red, slightly raised itching spots with a single puncture point in the center of each spot.

### **Treatment**

Flea bites can be treated with anti-itch creams, usually antihistamines or hydrocortisone.

## **Bed Bugs**

Bed bugs are small parasitic insects that feed on human blood. A number of health effects may occur due to bed bugs including skin rashes, prominent blisters, psychological effects and allergic symptoms. Diagnosis involves finding the bed bugs and the occurrence of compatible symptoms. Treatment is otherwise symptomatic.

Adult bed bugs are reddish-brown, flattened, oval and wingless. Bed bugs have microscopic hairs that give them a banded appearance. Adults grow to 4-5mm in length and 1.5-3 mm wide. A bed bug pierces the skin of its host with two hollow feeding tubes shaped like tongues. The one tube injects its saliva, which contains anticoagulants and anesthetics, while the other draws blood of its host. After feeding for approximately five minutes, the bug returns to its hiding place. Although bed bugs can live for a year without feeding, they normally feed every five to ten days.

Eradication of bed bugs frequently requires a combination of pesticide and non-pesticide approaches. Pyrethroids, dichlorvos, and malathion have historically been effective. Mechanical approaches include vacuuming and heat treating or wrapping mattresses have also been recommended.

**ATTACHMENT 1**  
**RICKETTSIAL INFECTIONS**

## **Rickettsial Infections**

### **Description**

Many species of *Rickettsia* can cause illnesses in humans (Table below). The term “rickettsiae” conventionally embraces a polyphyletic group of microorganisms in the class Proteobacteria, comprising species belonging to the genera *Rickettsia*, *Ehrlichia*, *Coxiella*, and *Bartonella*. These agents are usually not transmissible directly from person to person except by blood transfusion or organ transplantation, although sexual and placental transmission has been proposed for *Coxiella*. Transmission generally occurs via an infected arthropod vector or through exposure to an infected animal reservoir host. However, sennetsu fever is acquired following consumption of raw fish products. The clinical severity and duration of illnesses associated with different rickettsial infections vary considerably, even within a given antigenic group. Rickettsioses range in severity from diseases that are usually relatively mild (cat scratch disease) to those that can be life-threatening (murine typhus) and they vary in duration from those that can be self-limiting to chronic (Q fever and bartonellosis) or recrudescent (Brill-Zinsser disease). Most patients with rickettsial infections recover with timely use of appropriate antibiotic therapy.

Travelers may be at risk for exposure to agents of rickettsial diseases if they engage in occupational or recreational activities which bring them into contact with habitats that support the vectors or animal reservoir species associated with these pathogens.

The geographic distribution and the risks for exposure to rickettsial agents are described below and in the Table below.

### **Trench Fever**

Trench fever, which is caused by *Bartonella quintana*, is transmitted from one person to another by the human body louse. Contemporary outbreaks of both diseases are rare in most developed countries and generally occur only in communities and populations in which body louse infestations are frequent, especially during the colder months when louse-infested clothing is not laundered. Foci of trench fever have also been recognized among homeless populations in urban centers of industrialized countries. Travelers who are not at risk of exposure to body lice or to persons with lice are unlikely to acquire these illnesses. However, health-care workers who care for these patients may be at risk for acquiring louse-borne illnesses through inhalation or inoculation of infectious louse feces into the skin or conjunctiva.

## Murine Typhus

Murine typhus, which is caused by infection with *Rickettsia typhi*, is transmitted to humans by rat fleas, particularly during exposure in rat-infested buildings (3). Flea-infested rats can be found throughout the year in humid tropical environments, especially in harbor or riverine environments. In temperate regions, they are most common during the warm summer months.

Travelers who participate in outdoor activities in grassy or wooded areas (e.g., trekking, camping, or going on safari) may be at risk for acquiring tick-borne illnesses, including those caused by *Rickettsia*, and *Ehrlichia* species (see below).

**TABLE Epidemiologic features and symptoms of rickettsial diseases**

ANTIGENIC GROUP	DISEASE	AGENT	PREDOMINANT SYMPTOMS*	VECTOR OR ACQUISITION MECHANISM	ANIMAL RESERVOIR	GEOGRAPHIC DISTRIBUTION OUTSIDE THE US
Typhus fevers	Murine typhus	<i>R. typhi</i>	As above, generally less severe	Rat flea	Rats, mice	Worldwide
Spotted fevers						
Coxiella	Q fever	<i>Coxiella burnetii</i>	Fever, headache, chills, sweating, pneumonia, hepatitis, endocarditis	Most human infections are acquired by inhalation of infectious aerosols; tick	Goats, sheep, cattle, domestic cats, other	Worldwide
Bartonella	Cat-scratch disease	<i>Bartonella henselae</i>	Fever, adenopathy, neuroretinitis, encephalitis	Cat flea	Domestic cats	Worldwide
	Trench fever	<i>B. quintana</i>	Fever, headache, pain in shins, splenomegaly, disseminated rash	Human body louse	Humans	Worldwide
Ehrlichia	Ehrlichiosis	<i>Ehrlichia chaffeensis</i> <sup>#</sup>	Fever, headache, nausea, occasionally rash	Tick	Various large and small mammals, including deer and rodents	Worldwide

This represents only a partial list of symptoms. Patients may have different symptoms or only a few of those listed.

## Anaplasmosis and Ehrlichiosis

Human ehrlichiosis and anaplasmosis are acute tick-borne diseases, associated with the lone star tick, *Amblyomma americanum*, and *Ixodes* ticks, respectively. Because one tick may be infected with more than one tick-borne pathogen (e.g. *Borrelia burgdorferi*, the causative agent of Lyme disease, or various *Babesia* species, agent of human babesiosis), patients may be present with



atypical clinical symptoms that complicate treatment. Ehrlichioses and anaplasmosis are characterized by infection of different types of leukocytes, where the causative agent multiplies in cytoplasmic membrane-bound vacuole called morulae. Morulae can sometimes be detected in Giemsa-stained blood smears.

## **Q FEVER**

Q fever occurs worldwide, most often in persons who have contact with infected goat, sheep, cat and cattle, particularly parturient animals (especially farmers, veterinarians, butchers, meat packers, and seasonal workers). Travelers who visit farms or rural communities can be exposed to *Coxiella burnetii*, the agent of Q fever, through airborne transmission (via animal-contaminated soil and dust) or less commonly through consumption of unpasteurized milk products or by exposure to infected ticks. These infections may initially result in only mild and self-limiting influenza-like illnesses, but if untreated, infections may become chronic, particularly in persons with preexisting heart valve abnormalities or with prosthetic valves. Such persons can develop chronic and potentially fatal endocarditis.

## **Cat-Scratch Disease**

Cat-scratch disease is contracted through scratches and bites from domestic cats, particularly kittens, infected with *Bartonella henselae*, and possibly from their fleas (3, 4). Exposure can therefore occur wherever cats are found.

## **Symptoms**

Clinical presentations of rickettsial illnesses vary (Table above), but common early symptoms, including fever, headache, and malaise, are generally nonspecific. Illnesses resulting from infection with rickettsial agents may go unrecognized or are attributed to other causes. Atypical presentations are common and may be expected with poorly characterized non-indigenous agents, so appropriate samples for examination by specialized reference laboratories should be obtained. A diagnosis of rickettsial diseases is based on two or more of the following: 1) clinical symptoms and an epidemiologic history compatible with a rickettsial disease, 2) the development of specific convalescent-phase antibodies reactive with a given pathogen or antigenic group, 3) a positive polymerase chain reaction test result, 4) specific immunohistologic detection of rickettsial agent, or 5) isolation of a rickettsial agent. Ascertaining the likely place and the nature of potential exposures is particularly helpful for accurate diagnostic testing.

## Prevention

With the exception of the louse-borne diseases described above, for which contact with infectious arthropod feces is the primary mode of transmission (through autoinoculation into a wound, conjunctiva, or inhalation), travelers and health-care providers are generally not at risk for becoming infected via exposure to an ill person. Limiting exposures to vectors or animal reservoirs remains the best means for reducing the risk for disease. Travelers and persons working in areas where organisms may be present should implement prevention based on avoidance of vector-infested habitats, use of repellents and protective clothing, prompt detection and removal of arthropods from clothing and skin, and attention to hygiene.

Q fever and *Bartonella* group diseases may pose a special risk for persons with abnormal or prosthetic heart valves, and *Rickettsia*, *Ehrlichia*, and *Bartonella* for persons who are immunocompromised.

## **ATTACHMENT 2**

### **ENCEPHALITIS ARBOVIRAL ENCEPHALITIDES**

## Encephalitis Arboviral Encephalitides

### Perspectives

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the *Togaviridae* (genus *Alphavirus*, *Flaviviridae*, and *Bunyaviridae*).

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).

Arboviral encephalitides have a global distribution which is transmitted by mosquitoes. Powassan, is a minor cause of encephalitis in the northern United States, and is transmitted by ticks. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

The majority of human infections is asymptomatic or may result in a nonspecific flu-like syndrome. Onset may be insidious or sudden with fever, headache, myalgias, malaise and occasionally prostration. Infection may, however, lead to encephalitis, with a fatal outcome or permanent neurologic sequelae. Fortunately, only a small proportion of infected persons progress to frank encephalitis.

Experimental studies have shown that invasion of the central nervous system (CNS), generally follows initial virus replication in various peripheral sites and a period of viremia. Viral transfer from the blood to the CNS through the olfactory tract has been suggested. Because the arboviral encephalitides are viral diseases, antibiotics are not effective for treatment and no effective antiviral drugs have yet been discovered.

## Prevention

Arboviral encephalitis can be prevented in two major ways: personal protective measures and public health measures to reduce the population of infected mosquitoes. Personal measures include reducing time outdoors particularly in early evening hours, wearing long pants and long sleeved shirts and applying mosquito repellent to exposed skin areas. Public health measures often require spraying of insecticides to kill juvenile (larvae) and adult mosquitoes.

Selection of mosquito control methods depends on what needs to be achieved; but, in most emergency situations, the preferred method to achieve maximum results over a wide area is aerial spraying. In many states aerial spraying may be available in certain locations as a means to control nuisance mosquitoes. Such resources can be redirected to areas of virus activity. When aerial spraying is not routinely used, such services are usually contracted for a given time period. Financing of aerial spraying costs during large outbreaks is usually provided by state emergency contingency funds. Federal funding of emergency spraying is rare and almost always requires a federal disaster declaration. Such disaster declarations usually occur when the vector-borne disease has the potential to infect large numbers of people, when a large population is at risk and when the area requiring treatment is extensive. Special large planes maintained by the United States Air Force can be called upon to deliver the insecticide(s) chosen for such emergencies. Federal disaster declarations have relied heavily on risk assessment by the CDC.

There are no commercially available human vaccines for these U.S. diseases.

## **Powassan Encephalitis**

Powassan (POW) virus is a flavivirus and currently the only well documented tick-borne transmitted arbovirus occurring in the United States and Canada. Recently a Powassan-like virus was isolated from the deer tick, *Ixodes scapularis*. Its relationship to POW and its ability to cause human disease has not been fully elucidated. POW's range in the United States is primarily in the upper tier States. In addition to isolations from man, the virus has been recovered from ticks (*Ixodes marxi*, *I. cookei* and *Dermacentor andersoni*) and from the tissues of a skunk (*Spilogale putorius*). It is a rare cause of acute viral encephalitis. POW virus was first isolated from the brain of a 5-year-old child who died in Ontario in 1958. Patients who recover may have residual neurological problems.

## **Other Arboviral Encephalitides**

Many other arboviral encephalitides occur throughout the world. Most of these diseases are problems only for those individuals traveling to countries where the viruses are endemic.

## **West Nile Encephalitis**

Discussed elsewhere in this document

## FLD 43 D HAZARDOUS PLANTS

A number of hazardous plants may be encountered during field operations. The ailments associated with these plants range from mild hay fever to contact dermatitis. Plants that present the greatest risk to site workers are those that produce allergic reactions and tissue injury.

### Plants That Cause Skin and Tissue Injury

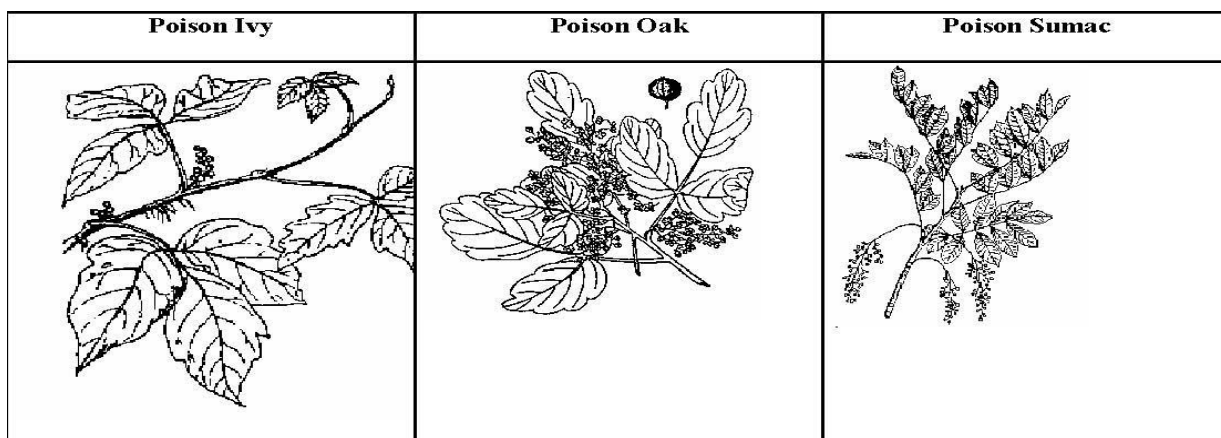
Contact with sharp leaves and thorns are of special concern to site personnel. This concern stems from the fact that punctures, cuts, and even minor scrapes caused by accidental contact may result in skin lesions and the introduction of fungi or bacteria through the skin. This is especially important in light of the fact that the warm moist environment created inside protective clothing is ideal for the propagation of fungal and bacterial infection. Personnel receiving any of the injuries listed above, even minor scrapes shall report immediately for continued observation and care. Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

### Plants That Cause an Allergic Reaction

The poisonous plants of greatest concern are poison ivy, poison oak, and poison sumac. Contact with the poisonous sap of these plants produces a severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim also may develop a high fever and may be very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours.

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. In certain seasons, both plants also have greenish-white flowers and berries that grow in clusters. Poison sumac is a tall shrub or small tree with 6 to 12 leaflets arranged in pairs with a single leaflet at the end. This plant grows in wooded, swampy areas.

**Poison Ivy/Poison Oak/Poison Sumac**



The reaction associated with exposure to these plants will generally cause the following signs and symptoms:

- Blistering at the site of contact, usually occurring within 12 to 48 hours after contact
- Reddening, swelling, itching and burning at the site of contact
- Pain, if the reaction is severe
- Conjunctivitis, asthma, and other allergic reactions if the person is extremely sensitive to the poisonous plant toxin

If the rash is scratched, secondary infections can occur. Preventive measures that are effective for most site personnel include:

- Avoid contact with any poisonous plants on site, and keep a steady watch to identify, report and mark poisonous plants found on site
- Wash hands, face or other exposed areas at the beginning of each break period and at the end of each workday
- Avoid contact with, and wash on a daily basis, contaminated tools, equipment and clothing
- Barrier creams, detoxification/wash solutions and orally administered desensitization may prove effective and should be tried to find the best preventive solution

Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

### **Plants That are Poisonous**

There are a number of plants worldwide beside poison ivy, oak and sumac which have poisonous properties. In many cases consumption of these plants or parts of these plants can result in poisoning. In other cases, contact with the plants may be poisonous. The following is a listing with pertinent information on poisonous properties and locations of a number of plants.

In general, when working in the outdoors or where you may come in contact with household plants or where your families may come in contact with these plants, it is important that as soon as possible after contact the area or areas should be thoroughly washed and hands must be thoroughly washed before eating drinking, smoking or any other hand to mouth contact.

In keeping with our 24/7 BBS concept, it is important to remember that children are particularly vulnerable to many of the poisonous parts of these plants. Many of these poisonous parts resemble non-poisonous food items such as berries and are attractive.

As with most lists there is extensive information but the list may not include all poisonous plants.

It is important to remember that this document is a starting point to be supplemented with local information. The majority of this information is from a list found in Wikipedia an on line Dictionary readily accessible via Google. The website has pictures of these plants as well as links to other information sources.

# POISONOUS PLANTS

From Wikipedia,

This is a list of plants containing poisonous parts that pose a serious risk of illness, injury, or death to humans.

## Poisonous Food Plants

- Apple (*Malus domestica*) **Found worldwide in cooler climates.** Seeds contain cyanogenic glycosides; although the amount found in most apples won't kill a person.
- Cherry (*Prunus cerasus*), as well as other species (*Prunus spp*) such as peach (*Prunus persica*), plum (*Prunus domestica*), almond (*Prunus dulcis*) and apricot (*Prunus armeninaca*). **There are around 430 species of *Prunus*, spread throughout the northern temperate regions of the globe.** Leaves and seeds contain cyanogenic glycosides
- Rhubarb (*Rheum rhaponticum*) **Found worldwide.** Leaves, but not stems, contain oxalic acid salts, causing kidney disorders, convulsions, and coma. Rarely fatal.
- Tomato (*Solanum lycopersicum*) **Found worldwide.** Foliage and vines contain alkaloid poisons which cause digestive upset and nervous excitement.

## Other Poisonous Plants

- Autumn crocus. **Found in North America.** The bulbs are poisonous and cause nausea, vomiting, diarrhea. **Can be fatal.**
- Azalea **Found Worldwide.** All parts of the plant are poisonous and cause nausea, vomiting, depression, breathing difficulties, and coma. Rarely fatal.
- Bittersweet nightshade **Naturalized in North America.** All parts are poisonous, containing solanine and causing fatigue, paralysis, convulsions and diarrhea. Rarely fatal.
- Bleeding heart / Dutchman's breeches. **Found in North America.** Leaves and roots are poisonous and cause convulsions and other nervous symptoms.
- Black locust. **Naturalized in North America.** Pods are toxic
- Caladium / Elephant ear. **Ornamental plants in North America.** All parts of the plant are poisonous. Symptoms are generally irritation, pain, and swelling of tissues. If the mouth or tongue swells, breathing may be fatally blocked.



- Castor Oil Plant (*Ricinus communis*) Castor Oil Plant. **Found Worldwide.** The phytotoxin is **ricin**, an extremely toxic water soluble protein, which is concentrated in the seed. Also present are ricinine, an alkaloid, and an irritant oil. Causes burning in mouth and throat, convulsions, and is **often fatal**.
- Daffodil. **Found worldwide.** The bulbs are poisonous and cause nausea, vomiting, and diarrhea. **Can be fatal.**
- Daphne (*Daphne sp.*) **Ornamental plant worldwide.** The berries (either red or yellow) are poisonous, causing burns to mouth and digestive tract, followed by coma. **Often fatal.**
- Darnel/Poison Ryegrass (*Lolium temulentum*) **Usually grows in the same production zones as wheat and is considered a weed.** The seeds and seed heads of this common garden weed may contain the alkaloids temuline and loline. Some experts also point to the fungus ergot or fungi of the genus endoconidium both of which grow on the seed heads of rye grasses as an additional source of toxicity.
- Deadly nightshade (*Atropa belladonna*) **Naturalized in parts of North America.** All parts of the plant contain the toxic alkaloid atropine. The young plants and seeds are especially poisonous, causing nausea, muscle twitches, paralysis; **often fatal**.
- Dumbcane / dieffenbachia. **Found in tropical areas and popular as house plants.** All parts are poisonous, causing intense burning, irritation, and immobility of the tongue, mouth, and throat. Swelling can be severe enough to block breathing leading to death.
- Ivy. **Native to North America** where winters are not severe. The leaves and berries are poisonous, causing stomach pains, labored breathing, possible coma.
- Jerusalem cherry **United States** All parts, especially the berries, are poisonous, causing nausea and vomiting. **Looks like a cherry tomato.** It is occasionally fatal, especially to children.
- Lilies **Worldwide** There are some 3500 species that comprise the lily (Lilaceae) family. Some are beneficial including (foods such as onion, shallot, garlic, chives [all *Allium* spp] and asparagus) and some with medicinal uses (colchicine and red squill) Many produce alkalids which are poisonous, especially to cats.
- Manchineel (*Hippomane mancinella*) **Native to the Caribbean (including Puerto Rico and the Virgin Islands).** It is one of the most poisonous trees in the world All parts of this tree including the fruit contain toxic phorbol esters typical of the Euphorbiaceae. Sap may cause burning of the skin and smoke from burning may cause eye irritation and blindness. Fruits, which are similar in appearance to an apple, are green or greenish-yellow when ripe.
- Oak Worldwide Most species foliage and acorns are mildly poisonous, causing digestive upset, heart trouble, contact dermatitis. Rarely fatal.

- Poison-ivy (*Toxicodendron radicans*), Poison-oak (*T. diversilobum*), and Poison Sumac (*T. vernix*) **North America** All parts of these plants contain a highly irritating oil with urushiol (this is actually not a poison but an allergen). Skin reactions can include blisters and rashes. It spreads readily to clothes and back again, and has a very long life. Infections can follow scratching.
- Pokeweed (*Phytolacca sp.*) **Native to North America.** Leaves, berries and roots contain phytolaccatoxin and phytolaccigenin - toxin in young leaves is reduced with each boiling and draining.

## **FLD 52 ASBESTOS EXPOSURE CONTROL PROGRAM**

This Exposure Control Program will be reviewed annually and updated as appropriate to reflect any changes that may impact WESTON's compliance status.

### **RELATED PROGRAMS:**

*Respiratory Protection Program*

*Occupational Medical Monitoring Program*

*Personal Protective Equipment Program*

WESTON will ensure that appropriate authorities are notified in accordance with regulations when asbestos work is to be performed and will ensure proper registrations are in place. Independent subcontractors not under WESTON's direct supervision will be solely responsible for notifications to appropriate federal, state, and local authorities.

This Program applies to all WESTON employees and subcontractors who work with asbestos.

### **Permissible Exposure Limits (PELS)**

WESTON will ensure that no employee will be exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter (f/cc) of air as an 8-hour time-weighted average (TWA), as determined by the method prescribed in Appendix A to this Program, or by an equivalent method.

WESTON will ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 f/cc of air averaged over a sampling period of 30 minutes, as determined by the method prescribed in Appendix A to this Program, or by an equivalent method.

### **Multi-Employer Worksites**

On multi-employer worksites, when performing work requiring the establishment of a regulated area, WESTON will inform other employers on the site of the nature of WESTON's work with asbestos and/or PACM, of the existence of and requirements pertaining to regulated areas, and the measures taken to ensure that employees of such other employers are not exposed to asbestos.

Asbestos hazards at a multi-employer work site will be abated by the contractor who created or controls the source of asbestos contamination. For example, if there is a significant breach of an enclosure containing Class I work, the employer responsible for erecting the enclosure will repair the breach immediately.

In addition, WESTON will comply with all applicable protective provisions of this standard to protect its employees exposed to asbestos hazards. For example, if employees working immediately adjacent to a Class I asbestos job are exposed to asbestos due to the inadequate containment of such job, their employer will either remove the employees from the area until the enclosure breach is repaired; or perform an initial exposure assessment pursuant to 20 CFR 1926.1101(f).

All employers of employees working adjacent to regulated areas established by WESTON on a multi-employer work-site will take steps on a daily basis to ascertain the integrity of the enclosure and/or the effectiveness of the control method relied on by the primary asbestos contractor to assure that asbestos fibers do not migrate to adjacent areas.

Likewise, on multi-employer sites WESTON will take steps on a daily basis to ascertain the integrity of the enclosure and/or the effectiveness of the control method relied on by the primary asbestos contractor to assure that asbestos fibers do not migrate to adjacent areas.

WESTON and all general contractors on a construction project which includes work covered by 29 CFR 1926.1101 will be expected to exercise general supervisory authority over the work covered by this standard, even though the general contractor is not qualified to serve as the asbestos “competent person” as defined by paragraph 29 CFR 1926.1101(b). As supervisor of the entire project, WESTON or the responsible general contractor will ascertain whether the asbestos contractor is in compliance with the asbestos standard, and will require such contractor to come into compliance with 29 CFR 1926.1101 when necessary.

### **Regulated Areas [under 29 CFR 1926.1101]**

**All Class I, II, and III asbestos work will be conducted within regulated areas.** All other operations covered by asbestos standards will be conducted within a regulated area where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed a PEL. Regulated areas will comply with the following requirements of 29 CFR 1926.1101(2), (3), (4), and (5).

- Demarcation: The regulated area will be demarcated to minimize the number of persons within the area and protect persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they will be used to demarcate the regulated area. Signs will be provided and displayed pursuant to the requirements of subsection 29 CFR 1926.1101(k)(7).
- Access: Access to regulated areas will be limited to authorized persons and to persons authorized by the 29 CFR 1926.1101.
- Respirators: All persons entering a regulated area where employees are required by 29 CFR 1926.1101(h)(1) to wear respirators will be supplied with a respirator selected in accordance with 29 CFR 1926.1101(h)(2) and 29 CFR 1910.134.
- Prohibited Activities: WESTON will ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated area.

### **Regulated Areas [under 29 CFR 1910.1001(e)]**

- Establishment: WESTON will establish regulated areas wherever airborne concentrations of asbestos and/or PACM are in excess of the TWA and/or excursion limit prescribed in 29 CFR 1910.1001(c).
- Demarcation: Regulated areas shall be demarcated from the rest of the workplace in any manner that minimizes the number of persons who will be exposed to asbestos.
- Access: Access to regulated areas shall be limited to authorized persons or to persons authorized by the Act or regulations issued pursuant thereto.
- Provision of Respirators: Each person entering a regulated area shall be supplied with and required to use a respirator, selected in accordance with 29 CFR 1910.1001(g)(2).
- Prohibited Activities: The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated areas.

## **Exposure Assessments and Monitoring**

### **1. General Monitoring Criteria**

When WESTON has a workplace or work operation where exposure monitoring is required under 29 CFR 1926.1101, WESTON will ensure monitoring is performed to determine accurately the airborne concentrations of asbestos to which employees may be exposed.

Determinations of employee exposure will be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee.

Representative 8-hour TWA employee exposure will be determined on the basis of one or more samples representing full-shift exposure for employees in each work area. Representative 30-minute short-term employee exposures will be determined on the basis of one or more samples representing 30 minute exposures associated with operations that are most likely to produce exposures above the excursion limit for employees in each work area.

### **2. Initial Exposure Assessment**

For asbestos projects covered by the standard WESTON will ensure that a “competent person” conducts an exposure assessment immediately before or at the initiation of the operation to ascertain expected exposures during that operation or workplace.

The assessment must be completed in time to comply with requirements that are triggered by exposure data or the lack of a “negative exposure assessment,” and to provide information necessary to assure that all control systems planned are appropriate for that operation and will work properly.

### **3. Basis of Initial Exposure Assessment**

Unless a negative exposure assessment has been made pursuant to 29 CFR 1926.1101(f)(2)(iii), the initial exposure assessment will, if feasible, be based on monitoring conducted according to 29 CFR 1926.1101(f)(1)(iii). The assessment will take into consideration both the monitoring results and all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the employer which indicate the levels of airborne asbestos likely to be encountered on the job.

For Class I asbestos work, until the employer conducts exposure monitoring and documents that employees on that job will not be exposed in excess of the PELs, or otherwise makes a negative exposure assessment pursuant to 29 CFR 1926.1101(f)(2)(iii), WESTON will presume that employees are exposed in excess of the TWA and excursion limit.

### **4. Negative Exposure Assessment**

For any one specific asbestos job which will be performed by employees who have been trained in compliance with the standard, a negative exposure assessment demonstrates that employee exposures will be below the PELs by data which conform to the following criteria:

- Objective data demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the TWA and excursion limit under those work conditions having the greatest potential for releasing asbestos; or

- WESTON has monitoring data from prior asbestos jobs for the 8-hour PEL and the excursion limit within 12 months of the current or projected job, the monitoring and analysis must have been performed in compliance with the asbestos standard in effect; and the data must have been obtained during work conducted under conditions “closely resembling” the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in WESTON’s current operations. The operations must have been conducted by employees whose training and experience are no more extensive than that of employees performing the current job, and, the data shows that under the conditions prevailing and which will prevail in the current workplace there is a high degree of certainty that employee exposures will not exceed the TWA and excursion limit, or
- The results of initial exposure monitoring of the current job made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee covering operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs.

## 5. Periodic Monitoring

WESTON will ensure that for all Class I and II operations daily monitoring representative of the exposure of each employee who is assigned to work within a regulated area, will be conducted unless a negative exposure assessment for the entire operation has been made.

Periodic monitoring of all work where exposures are expected to exceed a PEL, will be conducted at intervals sufficient to document the validity of the exposure prediction for all operations other than Class I and II operations.

Exception: When all employees required to be monitored daily are equipped with supplied-air respirators operated in the positive-pressure mode, the employer may dispense with the daily monitoring required by this paragraph. However, employees performing Class I work using a control method which is not listed in 29 CFR 1926.1101(g)(4)(i), (ii), or (iii), or using a modification of a listed control method, will continue to be monitored daily even if they are equipped with supplied-air respirators.

## 6. Termination of Monitoring

If the periodic monitoring required by 29 CFR 1926.1101(f)(3) reveals that employee exposures, as indicated by statistically reliable measurement, are below the permissible exposure limit and excursion limit the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

Additional monitoring will be provided whenever there has been a change in: process, control equipment, personnel or work practices that may result in new or additional exposures above the PEL and/or excursion limit. Additional monitoring will also be provided when the employer has any reason to suspect that a change may result in new or additional exposures above the PEL and/or excursion limit. Such additional monitoring is required regardless of whether a “negative exposure assessment” was previously produced for a specific job.

## 7. Observation of Monitoring

Affected employees and their designated representatives will be afforded an opportunity to observe any monitoring of employee exposure to asbestos conducted in accordance with this section.

When observation of the monitoring of employee exposure to asbestos requires entry into an area where the use of protective clothing or equipment is required, the observer will be provided with and be required to use such clothing and equipment and will comply with all other applicable safety and health procedures.

### **Methods of Compliance**

Prior to beginning an asbestos project, WESTON will supplement this written program, with a site-specific Health and Safety Plan (HASP), to reduce employee exposure below the TWA and the excursion limit by establishing site-specific engineering, work practice controls, and respiratory protection, and implementing the Health and Safety Plan.

Written programs and site-specific HASPs will be submitted upon request for examination and copying to the Assistant Secretary, the Director, affected employees and designated employee representatives.

The site-specific HASP will include, as a minimum, the procedures, practices and prohibitions identified in this Program and good practice to minimize employee exposure to asbestos and comply with regulations.

### **Engineering Controls and Work Practices**

WESTON will use the following engineering controls and work practices in all operations covered by this section, regardless of the levels of exposure:

- Vacuum cleaners equipped with HEPA filters to collect all debris and dust containing ACM and PACM, except as provided in 29 CFR 1926.1101(g)(8)(ii) in the case of roofing material.
- Wet methods, or wetting agents, to control employee exposures during asbestos handling, mixing, removal, cutting, application, and cleanup, except where employers demonstrate that the use of wet methods is infeasible due to for example, the creation of electrical hazards, equipment malfunction, and, in roofing, except as provide in 29 CFR 1926.1101(g)(8)(ii); and
- Prompt clean-up and disposal of wastes and debris contaminated with asbestos in leak-tight containers except in roofing operations, where the procedures specified in 29 CFR 1926.1101(g)(8)(ii) apply.

In addition to the requirements of 29 CFR 1926.1101(g)(1), WESTON will use the following control methods to achieve compliance with the TWA PEL and excursion limit prescribed by 29 CFR 1926.1101(c):

- Local exhaust ventilation equipped with HEPA filter dust collection systems;
- Enclosure or isolation of processes producing asbestos dust;
- Ventilation of the regulated area to move contaminated air away from the breathing zone of employees and toward a filtration or collection device equipped with a HEPA filter;
- Use of other work practices and engineering controls that the Assistant Secretary can show to be feasible.

Wherever the feasible engineering and work practice controls described above are not sufficient to reduce employee exposure to or below the PEL and/or excursion limit prescribed in 29 CFR 1926.1101(c), WESTON will use them to reduce employee exposure to the lowest levels attainable by these controls and

will supplement them by the use of respiratory protection that complies with the requirements of 29 CFR 1926.1101(h).

### Prohibitions

The following work practices and engineering controls will not be used for work related to asbestos or for work which disturbs ACM or PACM, regardless of measured levels of asbestos exposure or the results of initial exposure assessments:

- High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.
- Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.
- Dry sweeping, shoveling or other dry clean-up of dust and debris containing ACM and PACM.
- Employee rotation as a means of reducing employee exposure to asbestos.

### **Class I Requirements**

In addition to the provisions of 29 CFR 1926.1101(g)(1) and (2), the following engineering controls and work practices and procedures will be used:

- All Class I work, including the installation and operation of the control system will be supervised by a competent person as defined in 29 CFR 1926.1101(b);
- For all Class I jobs involving the removal of more than 25 linear or 10 square feet of thermal system insulation or surfacing material; for all other Class I jobs, where WESTON cannot produce a negative exposure assessment as provided for in 29 CFR 1926.1101(f)(2)(iii), or where employees are working in areas adjacent to the regulated area, while the Class I work is being performed, WESTON will ensure one of the following methods to ensure that airborne asbestos does not migrate from the regulated area is used:
  - WESTON will ensure that critical barriers are placed over all the openings to the regulated area, except where activities are performed outdoors; or
  - WESTON will ensure use of another barrier or isolation method which prevents the migration of airborne asbestos from the regulated area, as verified by perimeter area surveillance during each work shift at each boundary of the regulated area, showing no visible asbestos dust; and perimeter area monitoring showing that clearance levels contained in 40 CFR Part 763, Subpart. E, of the EPA Asbestos in Schools Rule are met, or that perimeter area levels, measured by Phase Contrast Microscopy (PCM) are no more than background levels representing the same area before the asbestos work began. The results of such monitoring will be made known to WESTON no later than 24 hours from the end of the work shift represented by such monitoring. Exception: For work completed outdoors where employees are not working in areas adjacent to the regulated areas, 29 CFR 1926.1101(g)(4)(ii) is satisfied when the specific control methods in 29 CFR 1926.1101(g)(5) are used.
- For all Class I jobs, HVAC systems will be isolated in the regulated area by sealing with a double layer of 6 mil plastic or the equivalent;
- For all Class I jobs, impermeable drop-cloths will be placed on surfaces beneath all removal activity;



- For all Class I jobs, all objects within the regulated area will be covered with impermeable drop-cloths or plastic sheeting which is secured by duct tape or an equivalent.
- For all Class I jobs where WESTON cannot produce a negative exposure assessment, or where exposure monitoring shows that a PEL is exceeded, the WESTON will ventilate the regulated area to move contaminated air away from the breathing zone of employees toward a HEPA filtration or collection device.

### **Specific Control Methods for Class I Work**

In addition, WESTON will perform Class I asbestos work using one or more of the following control methods pursuant to the limitations stated below:

#### Negative Pressure Enclosure (NPE) Systems

NPE systems may be used where the configuration of the work area does not make the erection of the enclosure infeasible, with the following specifications and work practices:

- Specifications
  - The NPE may be of any configuration;
  - At least 4 air changes per hour must be maintained in the NPE;
  - A minimum of -0.02 column inches of water pressure differential, relative to outside pressure, must be maintained within the NPE as evidenced by manometric measurements;
  - The NPE must be kept under negative pressure throughout the period of its use; and
  - Air movement must be directed away from employees performing asbestos work within the enclosure, and toward a HEPA filtration or a collection device.
- Work Practices
  - Before beginning work within the enclosure and at the beginning of each shift, the NPE will be inspected for breaches and smoke-tested for leaks, and any leaks sealed.
  - Electrical circuits in the enclosure will be deactivated, unless equipped with ground-fault circuit interrupters.

#### Glove Bag Systems

Glove bag systems may be used to remove PACM and/or ACM from straight runs of piping and elbows and other connections with the following specifications and work practices:

- Specifications
  - Glove-bags must be made of 6 mil thick plastic and will be seamless at the bottom.
  - Glove-bags used on elbows and other connections must be designed for that purpose and used without modifications.
- Work Practices
  - Each glove-bag must be installed so that it completely covers the circumference of pipe or other structure where the work is to be done.
  - Glove-bags must be smoke-tested for leaks and any leaks sealed prior to use.

- Glove-bags may be used only once and may not be moved.
- Glove-bags must not be used on surfaces whose temperature exceeds 150 deg. F.
- Prior to disposal, glove-bags must be collapsed by removing air within them using a HEPA vacuum.
- Before beginning the operation, loose and friable material adjacent to the glove-bag/box operation must be wrapped and sealed in two layers of six mil plastic or otherwise rendered intact.
- Where system uses attached waste bag, such bag must be connected to collection bag using hose or other material which must withstand pressure of ACM waste and water without losing its integrity.
- A sliding valve or other device must separate waste bag from hose to ensure no exposure when waste bag is disconnected.
- At least two persons must perform Class I glove-bag removal operations.

#### Negative Pressure Glove Bag Systems

Negative pressure glove bag systems may be used to remove ACM or PACM from piping.

- Specifications
  - In addition to specifications for glove bag systems above, negative pressure glove bag systems must attach HEPA vacuum systems or other devices to bag to prevent collapse during removal.
- Work Practices
  - WESTON will ensure operations comply with the work practices for glove bag systems in 29 CFR 1926.1101( g)(5)(ii)(B)(4).
  - The HEPA vacuum cleaner or other device used to prevent collapse of bag during removal will run continually during the operation until it is completed at which time the bag will be collapsed prior to removal of the bag from the pipe.
  - Where a separate waste bag is used along with a collection bag and discarded after one use, the collection bag may be reused if rinsed clean with amended water before reuse.

#### Negative Pressure Glove Box Systems

Negative pressure glove boxes may be used to remove ACM or PACM from pipe runs with the following specifications and work practices.

- Specifications
  - Glove boxes will be constructed with rigid sides and made from metal or other material which can withstand the weight of the ACM and PACM and water used during removal;
  - A negative pressure generator will be used to create negative pressure in the system;
  - An air filtration unit will be attached to the box;
  - The box will be fitted with gloved apertures;
  - An aperture at the base of the box will serve as a bagging outlet for waste ACM and water;

- A back-up generator will be present on site;
- Waste bags will consist of 6 mil thick plastic double-bagged before they are filled or plastic thicker than 6 mil.
- Work Practices
  - At least two persons will perform the removal;
  - The box will be smoke-tested for leaks and any leaks sealed prior to each use;
  - Loose or damaged ACM adjacent to the box will be wrapped and sealed in two layers of 6 mil plastic prior to the job, or otherwise made intact prior to the job;
  - A HEPA filtration system will be used to maintain pressure barrier in box.

### Water Spray Process System

A water spray process system may be used for removal of ACM and PACM from cold line piping if, employees carrying out such process have completed a 40-hour separate training course in its use, in addition to training required for employees performing Class I work. The system will meet the following specifications and work will be performed by employees using the following work practices.

- Specifications
  - Piping will be surrounded on 3 sides by rigid framing,
  - A 360 degree water spray, delivered through nozzles supplied by a high pressure separate water line, will be formed around the piping.
  - The spray will collide to form a fine aerosol which provides a liquid barrier between workers and the ACM and PACM.
- Work Practices
  - The system will be run for at least 10 minutes before removal begins.
  - All removal will take place within the water barrier.
  - The system will be operated by at least three persons, one of whom will not perform removal, but will check equipment, and ensure proper operation of the system.
  - After removal, ACM and PACM will be bagged while still inside the water barrier.

### Walk-In Enclosure

A small walk-in enclosure which accommodates no more than two persons (mini-enclosure) may be used if the disturbance or removal can be completely contained by the enclosure with the following specifications and work practices.

- Specifications
  - The fabricated or job-made enclosure will be constructed of 6 mil plastic or equivalent.
  - The enclosure will be placed under negative pressure by means of a HEPA filtered vacuum or similar ventilation unit.
- Work practices
  - Before use, the mini-enclosure will be inspected for leaks and smoke-tested to detect breaches, and breaches sealed.

- Before reuse, the interior will be completely washed with amended water and HEPA-vacuumed.
- During use, air movement will be directed away from the employee's breathing zone within the mini-enclosure.

### **Alternative Control Methods for Class I Work**

WESTON may perform Class I work using a control method which is not referenced in 29 CFR 1926.1101(g)(5), or which modifies a control method referenced in 29 CFR 1926.1101(g)(5), if the following provisions are complied with:

- The control method will enclose, contain or isolate the processes or source of airborne asbestos dust, or otherwise capture or redirect such dust before it enters the breathing zone of employees.
- A certified industrial hygienist or licensed professional engineer who is also qualified as a project designer as defined in 29 CFR 1926.1101(b), evaluates the work area, the projected work practices, and the engineering controls and certifies in writing that the planned control method is adequate to reduce direct and indirect employee exposure to below the PELs under worst-case conditions of use, and that the planned control method will prevent asbestos contamination outside the regulated area, as measured by clearance sampling which meets the requirements of EPA's Asbestos in Schools rule issued under AHERA, or perimeter monitoring which meets the criteria in 29 CFR 1926.1101(g)(4)(ii)(B).
- Where the TSI or surfacing material to be removed is 25 linear or 10 square feet or less, the evaluation required in 29 CFR 1926.1101(g)(6) may be performed by a "competent person", and may omit consideration of perimeter or clearance monitoring otherwise required.
- The evaluation of employee exposure required in 29 CFR 1926.1101(g)(6) will include and be based on sampling and analytical data representing employee exposure during the use of such method under worst-case conditions and by employees whose training and experience are equivalent to employees who are to perform the current job.

### **Work Practices and Engineering Controls for Class II Work**

All Class II work will be supervised by a competent person as defined in 29 CFR 1926.1101(b).

For all indoor Class II jobs, where WESTON has not produced a negative exposure assessment provided for in 29 CFR 1926.1101(f)(2)(iii), or where during the job, changed conditions indicate there may be exposure above the PEL or where WESTON does not remove the ACM in a substantially intact state, WESTON will ensure use of one of the following methods so that airborne asbestos does not migrate from the regulated area:

- Critical barriers will be placed over all openings to the regulated area; or, WESTON will ensure use of another barrier or isolation method which prevents migration of airborne asbestos from the regulated area, as verified by perimeter area monitoring or clearance monitoring that meets criteria set by 29 CFR 1926.1101. (g)(4)(ii)(B).
- Impermeable drop-cloths will be placed on surfaces beneath all removal activity.
- All Class II asbestos work will be performed using the work practices and requirements set out in 29 CFR 1926.1101(g)(1)(i) through (g)(1)(iii).

## **Additional Controls for Class II Work**

Class II asbestos work may also be performed by complying with the work practices and controls designated for each type of asbestos work to be performed, set out in 29 CFR 1926.1101. Where more than one control method may be used for a type of asbestos work, WESTON may choose one or a combination of designated control methods. Class II work also may be performed using a method allowed for Class I work, except that glove bags and glove boxes are allowed if they fully enclose the Class II material to be removed.

### Flooring

For removing vinyl and asphalt flooring materials which contain ACM or for which in buildings constructed no later than 1980, and WESTON has not verified the absence of ACM as in 29 CFR 1926.1101(g)(8)(i)(I), WESTON will ensure that employees comply with the following work practices and are trained in these practices in accordance with 29 CFR 1926.1101(k)(9).

- Flooring or its backing will not be sanded.
- Vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) will be used to clean floors.
- Resilient sheeting will be removed by cutting with wetting of the snip point and wetting during de-lamination. Rip-up of resilient sheet floor material is prohibited.
- All scraping of residual adhesive and/or backing will be performed using wet methods.
- Dry sweeping is prohibited.
- Mechanical chipping is prohibited unless performed in a negative pressure enclosure which meets the requirements of 29 CFR 1926.1101(g)(5)(i).
- Tiles will be removed intact, unless WESTON demonstrates that intact removal is not possible.
- When tiles are heated and can be removed intact, wetting may be omitted.
- Resilient flooring material including associated mastic and backing will be assumed to be asbestos-containing unless an industrial hygienist determines that it is asbestos-free using recognized analytical techniques.

### Roofing

For removing roofing material which contains ACM, WESTON will ensure that the following work practices are followed:

- Roofing material will be removed in an intact state to the extent feasible.
- Wet methods will be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless wet methods are not feasible or will create safety hazards.
- Cutting machines will be continuously misted during use, unless a competent person determines that misting substantially decreases worker safety.
- When removing built-up roofs with asbestos-containing roofing felts and an aggregate surface using a power roof cutter, all dust resulting from the cutting operation will be collected by a HEPA dust collector, or will be HEPA vacuumed by vacuuming along the cut line. When removing built-up roofs with asbestos-containing roofing felts and a smooth surface using a power roof cutter, the dust resulting from the cutting operation will be collected either by a HEPA

dust collector or HEPA vacuuming along the cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line.

- Asbestos-containing material that has been removed from a roof will not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it will be lowered to the ground via covered, dust-tight chute, crane or hoist.
- Any ACM that is not intact will be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift. While the material remains on the roof it will either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.
- Intact ACM will be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift.
- Upon being lowered, unwrapped material will be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.
- Roof level heating and ventilation air intake sources will be isolated or the ventilation system will be shut down.
- Notwithstanding any other provision of this section, removal or repair of sections of intact roofing less than 25 square feet in area does not require use of wet methods or HEPA vacuuming as long as manual methods which do not render the material non-intact are used to remove the material and no visible dust is created by the removal method used. In determining whether a job involves less than 25 square feet, WESTON will include all removal and repair work performed on the same roof on the same day.

#### Siding, Shingles, or Transite Panels

When removing cementitious asbestos-containing siding and shingles or transite panels containing ACM on building exteriors other than roofs [see above and 29 CFR 1926.1101(g)(8)(ii)], WESTON will ensure that the following work practices are followed:

- Cutting, abrading or breaking siding, shingles, or transite panels, will be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release cannot be used.
- Each panel or shingle will be sprayed with amended water prior to removal.
- Unwrapped or unbagged panels or shingles will be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift.
- Nails will be cut with flat, sharp instruments.

#### Gaskets

When removing gaskets containing ACM, WESTON will ensure that the following work practices are followed:

- If a gasket is visibly deteriorated and unlikely to be removed intact, removal will be undertaken within a glove-bag as described in 29 CFR 1926.1101(g)(5)(ii).
- The gasket will be immediately placed in a disposal container.
- Any scraping to remove residue will be performed wet.

### Other Class II Removal

When performing any other Class II removal of ACM for which specific controls have not been listed in 29 CFR 1926.1101(g)(8)(iv)(A) through (D), WESTON will ensure compliance with the following work practices:

- The material will be thoroughly wetted with amended water prior to and during its removal.
- The material will be removed in an intact state unless WESTON demonstrates that intact removal is not possible.
- Cutting, abrading or breaking the material will be prohibited unless WESTON can demonstrate that methods less likely to result in asbestos fiber release are not feasible.
- Asbestos-containing material removed will be immediately bagged or wrapped, or kept wetted, until transferred to a closed receptacle, no later than the end of the work shift.

### Alternative Work Practices and Controls

Instead of the work practices and controls listed in 29 CFR 1926.1101(g)(8)(i) through (v), WESTON may use different or modified engineering and work practice controls if the following provisions are complied with:

- WESTON can demonstrate by data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used, that employee exposure will not exceed the PELs under any anticipated circumstances.
- A competent person evaluates the work area, the projected work practices and the engineering controls, and will certify in writing, that the different or modified controls are adequate to reduce direct and indirect employee exposure to below the PELs under all expected conditions of use and that the method meets the requirements of 29 CFR 1926.1101. The evaluation will include and be based on data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used for the current job, and by employees whose training and experience are equivalent to employees who are to perform the current job.

### **Work Practices and Engineering Controls for Class III Asbestos Work**

Class III asbestos work will be conducted using engineering and work practice controls which minimize the exposure to employees performing the asbestos work and to bystander employees.

- The work will be performed using wet methods.
- To the extent feasible, the work will be performed using local exhaust ventilation.
- Where the disturbance involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation or surfacing material, WESTON will ensure use of impermeable drop-cloths, and isolation of the operation using mini-enclosures or glove bag systems as in 29 CFR 1926.1101(g)(5) or another isolation method.
- Where WESTON has not produced a negative exposure assessment for a job, or where monitoring results show the PEL has been exceeded, WESTON will ensure containment of the area using impermeable drop-cloths and plastic barriers or their equivalent, or will ensure isolation of the operation using a control system listed in and in compliance 29 CFR 1926.1101(g)(5).

- Employees performing Class III jobs, which involve the disturbance of thermal system insulation or surfacing material, or where WESTON has not produced a negative exposure assessment, or where monitoring results show a PEL has been exceeded, will wear respirators which are selected, used and fitted pursuant to provisions of 29 CFR 1926.1101(h).

#### **Class IV Asbestos Work**

Class IV asbestos jobs will be conducted by employees trained pursuant to the asbestos awareness training program set out in 29 CFR 1926.1101(k)(9). In addition, all Class IV jobs will be conducted in conformity with the requirements set out in 29 CFR 1926.1101(g)(1), mandating wet methods, HEPA vacuums, and prompt clean up of debris containing ACM or PACM.

- Employees cleaning up debris and waste in a regulated area where respirators are required will wear respirators which are selected, used and fitted pursuant to provisions of 29 CFR 1926.1101(h).
- Employers of employees who clean up waste and debris in, and employers in control of, areas where friable thermal system insulation or surfacing material is accessible, will assume that such waste and debris contain asbestos.

#### **Alternative Methods of Compliance for Installation, Removal, Repair, and Maintenance of Certain Roofing and Pipeline Coating Materials**

Notwithstanding any other provision of 29 CFR 1926.1101, WESTON will comply with all provisions of 29 CFR 1926.1101(g)(11) when installing, removing, repairing, or maintaining intact pipeline asphaltic wrap, or roof flashings which contain asbestos fibers encapsulated or coated by bituminous or resinous compounds and will be deemed to be in compliance with 29 CFR 1926.1101. If WESTON does not comply with all provisions of 29 CFR 1926.1101(g)(11) or if during the course of the job the material does not remain intact, the provisions of 29 CFR 1926.1101(g)(8) will be used instead of 29 CFR 1926.1101(g)(11).

- Before work begins and as needed during the job, a competent person who is capable of identifying asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate such hazards, will conduct an inspection of the worksite and determine that the roofing material is intact and will likely remain intact.
- All employees performing work covered by 29 CFR 1926.1101(g)(11) will be trained in a training program that meets the requirements of 29 CFR 1926.1101(k)(9)(viii).
- The material will not be sanded, abraded, or ground. Manual methods which do not render the material non-intact will be used.
- Material that has been removed from a roof will not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it will be lowered to the ground via covered, dust-tight chute, crane or hoist. All such material will be removed from the roof as soon as is practicable, but in any event no later than the end of the work shift.
- Where roofing products which have been labeled as containing asbestos according to 29 CFR 1926.1101(k)(8) are installed on non-residential roofs during operations covered by 29 CFR 1926.1101(g)(11), WESTON will ensure the building owner is notified of the presence and location of such materials no later than the end of the job.
- All removal or disturbance of pipeline asphaltic wrap will be performed using wet methods.



## **Respiratory Protection**

No employee will be assigned to asbestos work that requires respirator use if, based on their most recent medical examination, the examining physician determines that the employee will be unable to function normally while using a respirator, or that the safety or health of the employee or other employees will be impaired by the employee's respirator use. Such employees must be assigned to another job or given the opportunity to transfer to a different position that they can perform. If such a transfer position is available, it must be with the same employer, in the same geographical area, and with the same seniority, status, rate of pay, and other job benefits the employee had just prior to such transfer.

### Respirator Use

Respiratory Protection will be used in accordance with WESTON's Respiratory Protection Program, in compliance with 29 CFR 1910.134 and under the following conditions:

- During the interval necessary to install or implement feasible engineering and work practice controls;
- In work operations, such as maintenance and repair activities, or other activities for which engineering and work practice controls are not feasible;
- In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the TWA and/or excursion limit;
- During all Class I asbestos jobs;
- During all Class II and III asbestos jobs where a "negative exposure assessment" has not been produced;
- During all Class III jobs where TSI or surfacing ACM or PACM is being disturbed;
- Class IV asbestos work performed within regulated areas where employees who are performing other work are required to use respirators;
- During all work covered by 29 CFR 1926.1101 where employees are exposed above the TWA or excursion limit; and
- In emergencies.

Each employee who uses a filter respirator for protection will be permitted to change the filter elements whenever an increase in breathing resistance is detected and WESTON will maintain an adequate supply of filter elements for this purpose.

Employees who wear respirators will be permitted to leave work areas to wash their faces and respirator facepieces whenever necessary to prevent skin irritation associated with respirator use.

### Respirator Selection

Where respirators are required this plan and 29 CFR 1926.1101, the appropriate respirator specified in Table 1 will be used.

**NOTE: Filtering facepiece (Dust Mask) respirators are prohibited for protection from asbestos.**

**TABLE 1. RESPIRATORY PROTECTION FOR ASBESTOS FIBERS**

Type of Respirator <sup>1, 2</sup>	Quarter Mask	Half Mask	Full Facepiece	Helmet/Hood	Loose-fitting Facepiece
1. Air-Purifying Respirator (APR)	5	10 <sup>3</sup>	50		
2. Powered Air-Purifying Respirator (PAPR)		50	1,000	25/1,000 <sup>4</sup>	25
3. Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode		10	50		
• Continuous flow mode		50	1,000	25/1,000 <sup>4</sup>	25
• Pressure-demand or other positive-pressure mode		50	1,000		
4. Self-Contained Breathing Apparatus (SCBA)					
• Demand mode		10	50	50	
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)			10,000	10,000	

**Notes:**

These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 Subpart Z, WESTON will refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

1. WESTON may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.
2. The assigned protection factors in Table 1 are only effective when used in conjunction with WESTON's continuing, effective Respiratory Protection Program as required by 29 CFR 1910.134 which includes training, fit testing, maintenance, and use requirements.
3. This APF category includes filtering face pieces, and half masks with elastomeric face pieces.
4. WESTON will have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting face piece respirators, and receive an APF of 25.

WESTON will provide a powered, air purifying respirator (APR) in lieu of any negative pressure respirator specified in Table 1 whenever an employee chooses to use this type of respirator; and this respirator will provide adequate protection to the employee.

WESTON will provide a half-mask APR, other than a disposable respirator, that is equipped with high-efficiency filters when the employee performs:

- Class II and III asbestos work and a negative-exposure assessment have not been conducted.
- Class III asbestos work when TSI or surfacing ACM or PACM is being disturbed.

In addition to the above selection criteria, when employees are in a regulated area where Class I work is being performed, a negative exposure assessment of the area has not been produced, and the exposure assessment of the area indicates the exposure level will not exceed 1 f/cc as an 8-hour TWA, WESTON will ensure employees are provided with one of the following respirators:

- A tight-fitting powered APR equipped with high efficiency filters; or
- A full face-piece SAR operated in the pressure-demand mode equipped with HEPA egress cartridges.

**Note:** A high efficiency or P, N, or R 100 filter means a filter that is at least 99.97% efficient against mono-dispersed particles of 0.3 micrometers in diameter or larger.

Whenever employees are working in a regulated area performing Class I work where a negative exposure assessment is not available and the exposure assessment indicates that the exposure level will be above 1 f/cc as an 8-hour TWA, a full face piece supplied-air respirator operated in the pressure-demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus will be provided.

Respirators must be those certified as acceptable for protection by the NIOSH.

Qualitative fit-tests (QLFT) protocols may only be used for fit-testing negative pressure air purifying respirators that must achieve a fit factor of 10 or less.

### **Protective Work Clothing and Equipment**

WESTON will provide personal protective equipment and ensure that it is used according to WESTON's Personal Protective Equipment program whenever employees are:

- Exposed to asbestos above the TWA and/or the excursion limit, or;
- Exposed to asbestos for which a required negative exposure assessment is not produced, or;
- Performing Class I operations that involves the removal of over 25 linear or 10 square feet of TSI or surfacing ACM and PACM, procedures will be implemented to ensure that employees uses appropriate protective work clothing.

WESTON's Personal Protective Equipment program conforms to applicable standards and specifications and includes, but is not limited to, coveralls or similar full-body work clothing, gloves, head coverings, and foot coverings.

### Laundrying

WESTON will ensure that contaminated reusable clothing is laundered to prevent the release of airborne asbestos in excess of the TWA or excursion limit prescribed in 29 CFR 1926.1101(c).

If contaminated clothing is given to another person for laundrying, WESTON will ensure such person is informed of the requirement in 29 CFR 1926.1101(i)(2)(i) to effectively prevent the release of airborne asbestos in excess of the TWA and excursion limit prescribed in 29 CFR 1926.1101(c).

### Contaminated Clothing

Contaminated clothing will be transported in sealed impermeable bags, or other closed, impermeable containers, and be labeled in accordance with 29 CFR 1926.1101(k).

### Inspection of Protective Clothing

The competent person will examine work suits worn by employees at least once per work shift for rips or tears that may occur during performance of work. When rips or tears are detected while an employee is working, rips and tears will be immediately mended, or the work suit will be immediately replaced.

Hygiene Facilities and Practices for Employees (applicable to jobs involving over 25 linear or 10 square feet of TSI or surfacing ACM and PACM)

WESTON will ensure compliance with the following requirements for employees performing Class I asbestos jobs involving over 25 linear or 10 square feet of TSI or surfacing ACM and PACM.

### **Decontamination Areas**

WESTON will ensure a decontamination area is established that is adjacent to and connected to the regulated area for the decontamination of employees who have been in the regulated area. The decontamination area will consist of an equipment room, shower area, and clean room in series. WESTON will ensure that employees enter and exit the regulated area through the decontamination area.

### Equipment Room

The equipment room will be supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective equipment.

### Shower Area

WESTON will provide shower facilities which comply with 29 CFR 1910.141(d)(3), unless WESTON can demonstrate that they are not feasible. The showers will be adjacent both to the equipment room and the clean room, unless WESTON can demonstrate that this location is not feasible. Where WESTON can demonstrate that it is not feasible to locate the shower between the equipment room and the clean room, or where the work is performed outdoors, WESTON will ensure that employees:

Remove asbestos contamination from their work suits in the equipment room using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or

Remove their contaminated work suits in the equipment room, then don clean work suits, and proceed to a shower that is not adjacent to the work area.

### Clean Change Room

The clean room will be equipped with a locker or appropriate storage container for each employee's use. When WESTON can demonstrate that it is not feasible to provide a clean change area adjacent to the work area or where the work is performed outdoors, WESTON may permit employees engaged in Class I asbestos jobs to clean their protective clothing with a portable HEPA-equipped vacuum before these employees leave the regulated area. Following showering, these employees, however, must then change into street clothing in clean change areas provided by WESTON which otherwise meets the requirements of 29 CFR 1926.1101.

### Decontamination Area Entry Procedures

WESTON will ensure that employees:

- (a) Enter the decontamination area through the clean room;
- (b) Remove and deposit street clothing within a locker provided for their use; and
- (c) Put on protective clothing and respiratory protection before leaving the clean room.
- (d) Employees pass through the equipment room before entering the regulated area.

#### Decontamination Area Exit Procedures

WESTON will ensure that employees will:

- (a) Remove all gross contamination and debris from their protective clothing before leaving the regulated area.
- (b) Remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers.
- (c) Not remove their respirators in the equipment room.
- (d) Shower prior to entering the clean room.
- (e) Enter the clean room before changing into street clothes, after showering.

#### Lunch Areas

Whenever food or beverages are consumed at the worksite where employees are performing Class I asbestos work, WESTON will ensure lunch areas are provided in which the airborne concentrations of asbestos are below the permissible exposure limit and/or excursion limit.

Hygiene Facilities and Practices for Employees (applicable to jobs involving less than 25 linear or 10 square feet of TSI or surfacing ACM and PACM and Class II and Class III asbestos work as specified below)

WESTON will ensure compliance with requirements for Class I work involving less than 25 linear or 10 square feet of TSI or surfacing ACM and PACM, and for Class II and Class III asbestos work operations where exposures exceed a PEL, or where there is no negative exposure assessment produced before the operation.

#### **Equipment Room/Area for Decontamination**

WESTON will ensure that an equipment room (or area that is adjacent to the regulated area) is established for the decontamination of employees and their equipment which is contaminated with asbestos. The equipment room/area will consist of an area covered by an impermeable drop cloth on the floor or horizontal working surface.

The area must be of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area (as determined by visible accumulations).

Work clothing must be cleaned with a HEPA vacuum before it is removed.

All equipment and surfaces of containers filled with ACM must be cleaned prior to removing them from the equipment room or area.

WESTON will ensure that employees enter and exit the regulated area through the equipment room or area.

### Hygiene Facilities and Practices for Employees (applicable to Class IV work)

WESTON will ensure that employees performing Class IV work within a regulated area comply with the hygiene practice required of employees performing work which has a higher classification within that regulated area. Otherwise WESTON will ensure employees cleaning up debris and material which is TSI or surfacing ACM or identified as PACM are provided decontamination facilities which are required by 29 CFR 1926.1101(j)(2).

### Smoking in Work Areas

WESTON will ensure that employees do not smoke in work areas where they are occupationally exposed to asbestos because of activities in that work area.

### Communication of Hazards

This section applies to the communication of information concerning asbestos hazards in construction activities to facilitate compliance with 29 CFR 1926.1101. Most asbestos-related construction activities involve previously installed building materials. Building owners often are the only and/or best sources of information concerning them. Therefore, they, along with WESTON, are assigned specific information conveying and retention duties under this section.

### **Duties of Building and Facility Owners**

Before work subject to this standard is begun, WESTON will confirm through reviews of hard data by a competent person that acceptable surveys have been conducted by building and facility owners to determine the presence, location, and quantity of ACM and/or PACM at the work site pursuant to 29 CFR 1926.1101(k)(1) unless it has been determined in compliance with 29 CFR 1926.1101(k)(5) that the material is not asbestos-containing.

WESTON will ensure that building and/or facility owners have notified in writing the following persons of the presence, location and quantity of ACM or PACM, at the work sites in their buildings and facilities:

Prospective employers applying or bidding for work whose employees reasonably can be expected to work in or adjacent to areas containing such material;

Employees of the owner who will work in or adjacent to areas containing such material:

On multi-employer worksites, all employers of employees who will be performing work within or adjacent to areas containing such materials;

Tenants who will occupy areas containing such material.

### **Duties of WESTON when Employees Perform Work Subject to 29 CFR 1926.1101 in or Adjacent to Areas Containing ACM and PACM**

Before work in areas containing ACM and PACM is begun; WESTON will ensure the presence, location, and quantity of ACM, and/or PACM therein has been determined and documented according to 29 CFR 1926.1101(k)(1).

Before work under 29 CFR 1926.1101 is performed, WESTON will ensure the following persons are informed of the location and quantity of ACM and/or PACM present in the area and the precautions to be taken to insure that airborne asbestos is confined to the area:

- Owners of the building/facility.
- Employees who will perform such work and employers of employees who work and/or will be working in adjacent areas.

Within 10 days of the completion of such work, WESTON will inform the building/facility owner and employers of employees who will be working in the area of the current location and quantity of PACM and/or ACM remaining in the area and final monitoring results, if any.

In addition to the above requirements, if WESTON discovers ACM and/or PACM on a worksite WESTON will convey information concerning the presence, location and quantity of such newly discovered ACM and/or PACM to the owner and to other employers of employees working at the work site, within 24 hours of the discovery.

### **Criteria to Rebut the Designation of Installed Material as PACM**

At any time, WESTON and/or a building owner may demonstrate, for purposes of 29 CFR 1926.1101, that PACM does not contain asbestos. Building owners and/or WESTON are not required to communicate information about the presence of building material for which such a demonstration pursuant to the requirements of 29 CFR 1926.1101(k)(5)(ii) has been made. However, in all such cases, the information, data and analysis supporting the determination that PACM does not contain asbestos, must be retained as required by 29 CFR 1926.1101(n). WESTON will require written documentation of this determination to be reviewed by a competent person.

WESTON may demonstrate that PACM does not contain more than 1 percent asbestos by the following:

- Having a completed inspection conducted pursuant to the requirements of AHERA (40 CFR Part 763, Subpart E) which demonstrates that the material is not ACM; or
- Performing a survey by an accredited inspector to include tests of the material containing PACM which demonstrate that no ACM is present in the material. Such tests will include analysis of bulk samples collected in the manner described in 40 CFR 763.86. The tests, evaluation, and sample collection will be conducted by an accredited inspector or by a CIH. Analysis of samples will be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) or the National Institute for Standards and Technology (NIST) or the Round Robin for bulk samples administered by the American Industrial Hygiene Association (AIHA) or an equivalent nationally-recognized round robin testing program.

WESTON and/or a building owner may demonstrate that flooring material including associated mastic and backing does not contain asbestos, by a determination of an industrial hygienist based upon recognized analytical techniques showing that the material is not ACM. This demonstration will be documented in writing and acceptable to WESTON.

## **Signs**

At the entrance to mechanical rooms/areas in which employees reasonably can be expected to enter and which contain ACM and/or PACM, WESTON will ensure that signs are posted which identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that ACM and/or PACM will not be disturbed. WESTON will ensure, to the extent feasible, that employees who come in contact with these signs can comprehend them. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training.

WESTON will ensure that warning signs that demarcate the regulated area will be provided and displayed at each location where a regulated area is required to be established by 29 CFR 1926.1101(e). Signs will be posted at such a distance from these locations that an employee may read the signs and take necessary protective steps before entering the area marked by the signs.

The warning signs required by 29 CFR 1926.1101(k)(7) will bear the following information.

**DANGER  
ASBESTOS  
CANCER AND LUNG DISEASE HAZARD  
AUTHORIZED PERSONNEL ONLY**

In addition, where the use of respirators and protective clothing are required in the regulated area, the warning signs will include the following:

**RESPIRATORS AND PROTECTION CLOTHING ARE REQUIRED IN THIS AREA**

WESTON will ensure that employees working in and contiguous to regulated areas comprehend the warning signs required to be posted by 29 CFR 1926.1101(k)(7)(i). Means to ensure employee comprehension may include the use of foreign languages, pictographs and graphics.

## **Labels**

WESTON will ensure that labels are affixed to all products containing asbestos and to all containers containing such products, including waste containers. Where feasible, installed asbestos products will contain a visible label.

Labels will be printed in large, bold letters on a contrasting background.

Labels will be used in accordance with the requirements of 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard, and will contain the following information:

**DANGER  
CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUST  
CANCER AND LUNG DISEASE HAZARD**

Labels will contain a warning statement against breathing asbestos fibers.

The provisions for labels required by 29 CFR 1926.1101(k)(8)(i) through (k)(8)(iii) do not apply where:



- (1) Asbestos fibers have been modified by a bonding agent, coating, binder, or other material, provided that the manufacturer can demonstrate that, during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the permissible exposure limit and/or excursion limit will be released, or
- (2) Asbestos is present in a product in concentrations less than 1.0 percent.
- (3) When a building owner or WESTON identifies previously installed PACM and/or ACM, WESTON will ensure labels or signs are affixed or posted so that employees will be notified of what materials contain PACM and/or ACM. WESTON will ensure such labels are attached in areas where they will clearly be noticed by employees who are likely to be exposed, such as at the entrance to mechanical room/areas. Signs required by 29 CFR 1926.1101(k)(6) may be posted in lieu of labels provided they contain information required for labeling. WESTON will ensure, to the extent feasible, that employees who come in contact with these signs or labels can comprehend them. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training.

### **Employee Information and Training**

WESTON will, at no cost to the employee, institute a training program for all employees who are likely to be exposed in excess of a PEL and for all employees who perform Class I through IV asbestos operations, and will ensure their participation in the program.

Training will be provided prior to or at the time of initial assignment and at least annually thereafter.

Training for Class I operations and for Class II operations that require the use of critical barriers (or equivalent isolation methods) and/or negative pressure enclosures under this section will be the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement workers training (40 CFR Part 763, subpart E, appendix C).

#### **Training for other Class II work**

- (1) For work with asbestos-containing roofing materials, flooring materials, siding materials, ceiling tiles, or transite panels, training will include at a minimum all the elements included in 29 CFR 1926.1101(k)(9)(viii), and in addition, the specific work practices and engineering controls set forth in 1926.1101(g) which specifically relate to that category. Such course will include “hands-on” training and will take at least 8 hours.
- (2) An employee who works with more than one of the categories of material specified in 29 CFR 1926.1101(k)(9)(iv)(A) will receive training in the work practices applicable to each category of material that the employee removes and each removal method that the employee uses.
- (3) For Class II operations not involving the categories of material specified in 29 CFR 1926.1101(k)(9)(iv)(A), training will be provided which will include at a minimum all the elements included in 29 CFR 1926.1101(k)(9)(viii) as well as, the specific work practices and engineering controls set forth in 29 CFR 1926(g) which specifically relate to the category of material being removed, and will include “hands-on” training in the work practices applicable to each category of material that the employee removes and each removal method that the employee uses.

Training for Class III employees will be consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2). This course will also include “hands-on” training and will take at least 16 hours.

Exception: For Class III operations for which the competent person determines that the EPA curriculum does not adequately cover the training needed to perform that activity, training will include as a minimum all the elements included in 29 CFR 1926.1101(k)(9)(viii) and in addition, the specific work practices and engineering controls set forth in 29 CFR 1926.1101(g) which specifically relate to that activity, and will include “hands-on” training in the work practices applicable to each category of material that the employee disturbs.

Training for employees performing Class IV operations will be consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(1). This course will include available information concerning the locations of thermal system insulation and surfacing ACM/PACM, and asbestos-containing flooring material, or flooring material where the absence of asbestos has not yet been certified; and instruction in recognition of damage, deterioration, and delamination of asbestos containing building materials. Such course will take at least 2 hours.

Training for employees who are likely to be exposed in excess of the PEL and who are not otherwise required to be trained under 29 CFR 1926.1101(k)(9)(iii) through (vi), will meet the requirements of 29 CFR 1926.1101 (k)(9)(viii).

#### Training Program

The training program will be conducted in a manner that the employee is able to understand. In addition to the content required in 29 CFR 1926.1101(k)(9)(iii) through (vi), WESTON will ensure that each such employee is informed of the following:

- Methods of recognizing asbestos, including the requirement in 29 CFR 1926.1101(k)(1) to presume that certain building materials contain asbestos;
- The health effects associated with asbestos exposure;
- The relationship between smoking and asbestos in producing lung cancer;
- The nature of operations that could result in exposure to asbestos, the importance of necessary protective controls to minimize exposure including, as applicable, engineering controls, work practices, respirators, housekeeping procedures, hygiene facilities, protective clothing, decontamination procedures, emergency procedures, and waste disposal procedures, and any necessary instruction in the use of these controls and procedures; where Class III and IV work will be or is performed, the contents of EPA 20T-2003, “Managing Asbestos In-Place” July 1990 or its equivalent in content;
- The purpose, proper use, fitting instructions, and limitations of respirators as required by 29 CFR 1910.134;
- The appropriate work practices for performing the asbestos job;
- Medical surveillance program requirements;
- The content of this standard including appendices;
- The names, addresses and phone numbers of public health organizations which provide information, materials and/or conduct programs concerning smoking cessation. WESTON may

distribute the list of such organizations contained in Appendix J of 29 CFR 1926.1101, to comply with this requirement; and

- The requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels.

#### Access to Training Materials

WESTON will make readily available to affected employees without cost, written materials relating to the employee training program, including a copy of this regulation.

WESTON will provide to the Assistant Secretary and the Director, upon request, all information and training materials relating to the employee information and training program.

WESTON will inform all employees concerning the availability of self-help smoking cessation program material. Upon employee request, WESTON will distribute such material, consisting of NIH Publication No. 89-1647, or equivalent self-help material, approved or published by a public health organization listed in Appendix J to 29 CFR 1926.1101.

WESTON will also provide, at no cost to employees who perform housekeeping operations in an area which contains ACM or PACM, an asbestos awareness training course, which shall at a minimum contain the following elements:

- health effects of asbestos
- locations of ACM and PACM in the building/facility
- recognition of ACM and PACM damage and deterioration
- requirements in this standard relating to housekeeping
- proper response to fiber release episodes

Each such employee shall be so trained at least once a year.

#### **Housekeeping**

Where vacuuming methods are selected, WESTON will ensure that HEPA filtered vacuuming equipment is used. The equipment will be used and emptied in a way that minimizes the reentry of asbestos into the workplace.

#### Waste Disposal

WESTON will ensure that asbestos waste, scrap, debris, bags, containers, equipment, and contaminated clothing consigned for disposal is collected and disposed of in sealed, labeled, impermeable bags or other closed, labeled, impermeable containers except in roofing operations where the procedures specified in 29 CFR 1926.1101(g)(8)(ii) apply.

#### Care of Asbestos-containing Flooring Material

WESTON will ensure that all vinyl and asphalt flooring material is maintained according to 29 CFR 1926.1101 unless the building/facility owner demonstrates, per 29 CFR 1926.1101(g)(8)(i)(I) that the flooring does not contain asbestos. WESTON will also ensure that:

- Sanding of flooring material is prohibited.
- Stripping of finishes will be conducted using low abrasion pads at speeds lower than 300 rpm and wet methods.
- Burnishing or dry buffing may be performed only on flooring which has sufficient finish so that the pad cannot contact the flooring material.

WESTON will ensure that waste and debris and accompanying dust in an area containing accessible thermal system insulation, surfacing ACM/PACM, or visibly deteriorated ACM:

- will not be dusted or swept dry, or vacuumed without using a HEPA filter
- will be promptly cleaned up and disposed of in leak tight containers

### **Medical Monitoring**

WESTON has a very comprehensive and progressive Health and Safety program. This includes a medical surveillance program for all employees who are or will be exposed to airborne concentrations of fibers of asbestos at or above the TWA and/or excursion limit. The effectiveness of this program has been verified through evaluation of results of WESTON's medical monitoring program.

A fully qualified Medical Contractor and Medical Director are integral parts of this program which is based upon demonstrated familiarity with the type of work that WESTON does. The medical evaluation for asbestos workers is provided by and under the direction of highly qualified Board Certified Occupational Physicians. The evaluation is consistent with and certifies employees to work with asbestos according to 29 CFR 1910.1001 and 1926.1101 and to wear respiratory protection according to 29 CFR 1910.134.

WESTON provides medical evaluations as part of the hiring process of workers in several categories as well as at a recurrent frequency based on the work performed. The purpose of WESTON's asbestos medical monitoring program is to:

- Determine WESTON workers fitness to work.
- Monitor health status in conformance with OSHA regulations for asbestos workers.
- Monitor effectiveness of WESTON's Health and Safety Program for asbestos workers.

### **Employees Covered**

Before an employee is assigned to work where airborne concentrations of asbestos fibers may be at or above the TWA and/or excursion limit, a pre-placement medical examination is provided.

The medical evaluations also comply with OSHA 29 CFR 1910.120, Hazardous Waste Site Worker; 29 CFR 1910.1001 and 29 CFR 1926.1101, for asbestos medical monitoring requirements; and 29 CFR 1910.1450 for exposure to hazardous chemicals.

The Initial/Exit and Periodic Protocol Examinations for these workers are used to initially certify and then periodically re-certify WESTON workers as medically fit to perform the jobs at the level of effort described below:

- Asbestos workers are employees who for a combined total of 30 or more days per year are engaged in Class I, II, and III work or are exposed at or above a PEL. For purposes of 29 CFR 1926.1101, any day in which a worker engages in Class II or Class III operations or a combination thereof on intact material for one hour or less (taking into account the entire time

spent on the removal operation, including cleanup) and, while doing so, adheres fully to the work practices specified in this standard, will not be counted. WESTON has instituted a medical surveillance program for these employees.

- The program determines fitness to work for employees who work with asbestos.
- Asbestos workers may have to perform a variety of tasks ranging from manual labor such as light to moderate lifting; driving; climbing and working at elevation; to simply observing the activities of other workers. The job assignment of asbestos workers will often determine frequency of lifting and weights of objects to be lifted.
- Many asbestos workers will also require certification to work on hazardous materials sites or in laboratories. All asbestos workers are medically evaluated and qualified to wear respiratory protection as required by 29 CFR 1910.134.

### Examination Content

#### (1) Initial/Exit Protocol

(a) The Initial/Exit Protocol, medical examination will normally be given as:

- (i) An entrance examination;
- (ii) At exit from potentially hazardous positions; and
- (iii) Termination from WESTON.

(b) The content of the initial and exit examination is provided in Appendix B of this Program.

#### (2) Periodic Protocol

(a) The Periodic Protocol examination will be used for annual assessments for all employees involved in hazardous materials site, asbestos, laboratory, and construction work.

(b) The content of the periodic examination is provided in Appendix B of this Program.

#### (3) Frequency

All items listed under the Initial/Exit and Periodic Protocols described above will be administered annually except as stated below:

CHEST X-RAY - one view (PA only): A PA Chest X-ray is required for all entry and exit examinations and periodically as indicated below:

ASBESTOS workers Chest X-Ray frequency is every two years (unless the worker is over 45 or the employees work with asbestos began more than 10 years ago)

Asbestos workers X-rays must be given a "B" reading.

#### (4) Information Provided to the Physician

(a) WESTON has provided the following information to the examining physician:

- (i) A copy of 29 CFR 1926.1101 and Appendices D and E of the standard.
- (ii) A description of the affected employee's duties as they relate to the employee's exposure.
- (iii) The employee's representative exposure level or anticipated exposure level.

- (iv) A description of any personal protective and respiratory equipment used or to be used.
- (v) Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

(5) Physician's Written Opinion

- (a) WESTON obtains a written signed opinion from the examining physician. This written opinion contains the results of the medical examination and will include:
  - (i) The physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos;
  - (ii) Any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators; and
  - (iii) A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions resulting from asbestos exposure that require further explanation or treatment.
  - (iv) A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.
- (6) WESTON has informed the medical consultant/physician to not reveal specific findings or diagnoses unrelated to occupational exposure to asbestos in the written opinion given to WESTON.
- (7) WESTON provides a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

**Medical Records and Employee Right to Access to Medical Records**

Medical records are retained in strict confidence by WESTON's Medical Consultant in accordance with 29 CFR 1910.20.

Employees are informed upon enrollment in WESTON's Medical Monitoring Program and formally reminded annually of their right to access to and to obtain copies of their medical records. They are instructed in how to obtain access and copies. Copies of medical records are provided at no charges to employees.

Recordkeeping (Objective Data Relied on Pursuant to 29 CFR 1926.1101[f])

Where WESTON has relied on objective data that demonstrates that products made from or containing asbestos, or the activity involving such products or material are not capable of releasing fibers of asbestos in concentrations at or above the PEL and/or excursion limit under the expected conditions of processing, use, or handling to satisfy the requirements of 29 CFR 1926.1101(f), WESTON will establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

The record will include at least the following information:

- (1) The product qualifying for exemption.
- (2) The source of the objective data.
- (3) The testing protocol, results of testing, and/or analysis of the material for the release of asbestos.

- (4) A description of the operation exempted and how the data support the exemption.
- (5) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

WESTON will retain this record for the duration of the WESTON's reliance upon such objective data.

### **Exposure Measurement Records**

WESTON keeps an accurate record of all measurements taken to monitor employee exposure to asbestos as prescribed in 29 CFR 1926.1101(f).

**NOTE:** WESTON may use the services of competent organizations such as industry trade associations and employee associations to maintain the records.

This record includes at least the following information:

- (1) The date of measurement;
- (2) The operation involving exposure to asbestos that is being monitored;
- (3) Sampling and analytical methods used and evidence of their accuracy;
- (4) Number, duration, and results of samples taken;
- (5) Type of protective devices worn, if any; and
- (6) Name, social security number, and exposure of the employees whose exposures are represented.

WESTON will maintain this record for at least thirty (30) years, in accordance with 29 CFR 1910.20.

### **Medical Surveillance Records**

WESTON has established and maintains an accurate record for each employee subject to medical surveillance by 29 CFR 1926.1101(m), in accordance with 29 CFR 1910.20.

The record includes at least the following information:

- (1) The name and social security number of the employee;
- (2) A copy of the employee's medical examination results, including the medical history, questionnaire responses, results of any tests, and physician's recommendations.
- (3) Physician's written opinions;
- (4) Any employee medical complaints related to exposure to asbestos; and
- (5) A copy of the information provided to the physician as required by 29 CFR 1926.1101(m).

WESTON will ensure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 29 CFR 1910.20.

### **Training Records**

WESTON will maintain all employee training records for one (1) year beyond the last date of employment by that employer.

## **Data to Rebut PACM**

Where WESTON has relied on data to demonstrate that PACM is not asbestos-containing, such data will be maintained for as long as they are relied upon to rebut the presumption.

## **Records of Required Notifications**

Where the building owner has communicated and received information concerning the identification, location and quantity of ACM and PACM, WESTON will maintain written records of such notifications and their content for the duration of ownership and will be transferred to successive owners of such buildings/facilities.

## **Availability of Records**

WESTON, upon written request, will make all records required to be maintained by this section available to the Assistant Secretary and the Director for examination and copying.

WESTON, upon request, will make any exposure records required by 29 CFR 1926.1101(f) and (n) available for examination and copying to affected employees, former employees, designated representatives, and the Assistant Secretary, in accordance with 29 CFR 1910.20(a) through (e) and (g) through (i).

WESTON, upon request, will make employee medical records required by 29 CFR 1926.1101(m) and (n) available for examination and copying to the subject employee, anyone having the specific written consent of the subject employee, and the Assistant Secretary, in accordance with 29 CFR 1910.20.

## **Transfer of Records**

WESTON will comply with the requirements concerning transfer of records set forth in 29 CFR 1910.20(h).

Should WESTON cease to do business and there is no successor employer to receive and retain the records for the prescribed period; WESTON will notify the Director at least 90 days prior to disposal and, upon request, transmit the records to the Director.

## **Competent Person**

### Designation of Competent Person

All WESTON asbestos projects will designate a competent person, who is qualified and has the authority to ensure worker safety and health.

In addition to definition in 29 CFR 1926.32 (f), the competent person will be capable of identifying existing asbestos hazards in the workplace; selecting the appropriate control strategy for asbestos exposure, and has the authority to take prompt corrective measures to eliminate hazards, as specified in 29 CFR 1926.32(f).

For Class I and Class II work, the competent person will be specially trained in a course that meets the criteria of EPA's Model Accreditation Plan (40 CFR Part 763) for project designer or supervisor, or its equivalent. For Class III and Class IV work, the competent person will be trained in an operations and maintenance (O&M) course developed by EPA [40 CFR 763.92(a)(2)].



### Specific Responsibilities of the Competent Person

As required by 29 CFR 1926.20(b)(2) and good practice, health and safety accident prevention programs will provide for frequent and regular inspections of the job sites, materials, and equipment to be made by the competent persons.

The competent person will make frequent and regular inspections of the job sites, in order to perform the duties set out in 29 CFR 1926.1101(p)(3)(i) and (ii).

- For Class I jobs, site inspections will be made at least once during each work shift, and at any time an employee requests an inspection.
- For Class II and III jobs, site inspections will be made at intervals sufficient to assess whether conditions have changed, and at any reasonable time an employee requests an inspection.

On all worksites where employees are engaged in Class I or II asbestos work, the competent person designated will perform or supervise the following duties, as applicable:

- (1) Set up the regulated area, enclosure, or other containment;
- (2) Ensure (by site inspection) the integrity of the enclosure or containment;
- (3) Set up procedures to control entry to and exit from the enclosure and/or area;
- (4) Supervise all employee exposure monitoring required by this section and ensure that it is conducted as required by 29 CFR 1926.1101(f);
- (5) Ensure that employees working within the enclosure and/or using glove bags wear protective clothing and respirators as required by 29 CFR 1926.1101(h) and (i);
- (6) Ensure through on-site supervision, that employees set up and remove engineering controls, use work practices and personal protective equipment in compliance with all requirements;
- (7) Ensure that employees use the hygiene facilities and observe the decontamination procedures specified in 29 CFR 1926.1101(j);
- (8) Ensure that through on site inspection engineering controls are functioning properly and employees are using proper work practices; and,
- (9) Ensure that notification requirement of 29 CFR 1926.1101(k) are met.

### Training for the Competent Person

For Class I, and II asbestos work the competent person will be trained in all aspects of asbestos removal and handling, including: abatement, installation, removal and handling; the contents of 29 CFR 1926.1101; the identification of asbestos; removal procedures, where appropriate; and other practices for reducing the hazard. Such training will be obtained in a comprehensive course for supervisors, such as a course conducted by an EPA or state approved training provider, certified by the EPA or a State, or a course equivalent in stringency, content, and length.

For Class III and IV asbestos work, the competent person will be trained in aspects of asbestos handling appropriate for the nature of the work. This will include procedures for setting up glove bags and mini enclosures, practices for reducing asbestos exposures, use of wet methods, the contents of 29 CFR

1926.1101, and the identification of asbestos. Such training will include successful completion of a course equivalent in curriculum and training method to the 16-hour Operations and Maintenance course developed by EPA for maintenance and custodial workers [See 40 CFR 763.92(a)(2)], or its equivalent in stringency, content, and length. Competent persons for Class III and IV work, may also be trained pursuant to the requirements of 29 CFR 1926.1101(o)(4)(i).

## APPENDIX A AIR SAMPLING

### 1. Method

- a. NIOSH method 7400 will be used to analyze for asbestos with qualification provided by Method 7402 with TEM analysis, if necessary.
- b. In Method 7400, air is drawn through a Mixed Cellulose Ester Filter (SKC Part number 225-312A or equivalent) at a rate of 2.0 liters per minute for shift duration sampling and 2.5 liters per minute for 30-minute sampling. Shift duration sampling periods will be a minimum of 7.5 hours. After four hours of sampling, filters will be examined and if notable loading is seen, a new filter will be used to complete the sampling. This will result in splitting the sampling period. The results of the two filters will be combined to calculate the TWA.
- c. The preferred collection device will be a 25 mm diameter cassette with an open-faced 50 mm electrically conductive extension cowl (SKC Part number 225321 or equivalent). The 37 mm cassette may be used if necessary, but only if written justification accompanies the sample results in the employee's exposure monitoring record. Cassettes for asbestos sample collection are not reused or reloaded.
- d. Personnel air sampling pumps capable of sustaining the 2.0 l/m flow rate required for eight hours will be used to collect the samples.
- e. Air sampling pumps and a representative filter train will be calibrated prior to and following sampling. A bios Dry Cal calibrator or equivalent will be used. A minimum of three trials with flow rates within 10% of each other will be required for a valid calibration.
- f. Where possible, a sufficient air volume for each air sample will be collected to yield between 100 and 1,300 fibers per square millimeter on the membrane filter. If a filter darkens in appearance or if loose dust is seen on the filter, a second sample will be started.
- g. Samples are shipped in a rigid container with sufficient packing material to prevent dislodging the collected fibers. Packing material that has a high electrostatic charge on its surface (e.g., expanded polystyrene) is not used as such material can cause loss of fibers to the sides of the cassette.
- h. Personal samples are taken in the "breathing zone" of the employee (i.e., attached to or near the collar or lapel near the worker's face).

### 2. Initial Air Sampling

- a. WESTON will ensure, for all Class I and II operations, daily monitoring representative of the exposure of each employee who is assigned to work within a regulated area will be conducted unless a negative exposure assessment for the entire operation has been made.
- b. WESTON will ensure that periodic monitoring of all work where exposures are expected to exceed a PEL, is conducted at intervals sufficient to document the validity of the exposure prediction for all operations other than Class I and II operations.
- c. Exception: When all employees required to be monitored daily are equipped with supplied-air respirators operated in the positive-pressure mode, WESTON may dispense with the daily monitoring required by this paragraph. However, employees performing Class I work using a control method which is not listed in 29 CFR 1926.1101(g)(4) (i), (ii), or (iii) or using a modification of a listed control method, will continue to be monitored daily even if they are equipped with supplied-air respirators.

### **3. Termination of Monitoring**

- a. If the periodic monitoring required by 29 CFR 1926.1101(f)(3) reveals that employee exposures, as indicated by statistically reliable measurement, are below the permissible exposure limit (PEL) and excursion limit WESTON may discontinue monitoring for those employees whose exposures are represented by such monitoring.
- b. Additional monitoring will be provided whenever there has been a change in: process, control equipment, personnel or work practices that may result in new or additional exposures above the PEL and/or excursion limit. Additional monitoring will also be provided when WESTON has any reason to suspect that a change may result in new or additional exposures above the PEL and/or excursion limit. Such additional monitoring is required regardless of whether a “negative exposure assessment” was previously produced for a specific job.

### **4. Analysis**

WESTON will use site personnel trained in NIOSH METHOD 7400 analysis, internal laboratories or will contract with laboratories that are AIHA Accredited for Asbestos Analysis. The competent person on each WESTON asbestos project is responsible for confirming the use of analytical protocols and quality control procedures, such as those provided in Appendix C.

## APPENDIX B CONTENT OF ASBESTOS MEDICAL EXAMINATIONS

The Initial, Periodic, and Exit Protocols for medical examinations of WESTON employees conducting asbestos work (as developed by WESTON's medical contractor) follow:

<b>CLEARANCES-BASELINE</b>	<b>History Questionnaire <sup>a</sup></b>	<b>Physical Exam</b>	<b>Blood Chemistry</b>	<b>Spirometry</b>	<b>Chest X-ray</b>	<b>Audiogram</b>	<b>EKG</b>
Asbestos/Respirator	X	X	X	X	FX#	X	X
CalOSHA/Asb/Haz/Resp	X	X	X	X	CX#	X	X
Asbestos/Haz/Respirator	X	X	X	X	FX#	X	X
<b>ANNUAL</b>	<b>History Questionnaire</b>	<b>Physical Exam</b>	<b>Blood Chemistry</b>	<b>Spiro</b>	<b>Chest X-ray</b>	<b>Audiogram</b>	<b>EKG</b>
Asbestos/Respirator	X	X	X	X	F#	X	@
CalOSHA/Asb/Haz/Resp	X	X	X	X	C#	X	@
Asbestos/Haz/Respirator	X	X	X	X	F#	X	@
Respirator Only	X	X		X		X	
<b>EXIT</b>	<b>History Questionnaire</b>	<b>Physical Exam</b>	<b>Blood Chemistry</b>	<b>Spiro</b>	<b>Chest X-ray</b>	<b>Audiogram</b>	<b>EKG</b>
Asbestos/Respirator	X	X	X	X	X#	X	
CalOSHA/Asb/Haz/Resp	X	X	X	X	CX#	X	
Asbestos/Haz/Respirator	X	X	X	X	FX#	X	

a = Questionnaires required by 29 CFR 1926.1101 Appendix D

@ = Performed for those 40 and older or if medically indicated

X = Components included in protocol.

X-ray with ILO interpretation

F = 1-view chest X-ray will be performed on all asbestos baseline and exit exams

Frequency of chest X-ray with annual exams will be based on age & years since first asbestos exposure

C = 2-view chest X-ray will be performed on all asbestos baseline and exit exams

Frequency of chest X-ray with annual exams will be based on age & years since asbestos first exposure

## APPENDIX C ANALYTICAL REQUIREMENTS

1. Fiber counts are made by positive phase contrast using a microscope with an 8 to 10 X eyepiece and a 40 to 45 X objective for a total magnification of approximately 400 X and a numerical aperture of 0.65 to 0.75. The microscope is also fitted with a green or blue filter.
2. Microscopes are fitted with a Walton-Beckett eyepiece graticule calibrated for a field diameter of 100 micrometers (+/-2 micrometers).
3. The phase-shift detection limit of the microscope is maintained at about 3 degrees measured using the HSE phase shift test slide as outlined below.
  - a. Place the test slide on the microscope stage and center it under the phase objective.
  - b. Bring the blocks of grooved lines into focus.

Note: The slide consists of seven sets of grooved lines (approximately 20 grooves to each block) in descending order of visibility from sets 1 to 7, with 7 being the least visible. The requirements for asbestos counting are that the microscope optics must resolve the grooved lines in set 3 completely, although they may appear somewhat faint, and that the grooved lines in sets 6 and 7 must be invisible. Sets 4 and 5 must be at least partially visible but may vary slightly in visibility between microscopes. A microscope that fails to meet these requirements has either too low or too high a resolution to be used for asbestos counting.

- c. If the image deteriorates, clean and adjust the microscope optics. If the problem persists, consult the microscope manufacturer.
4. Each set of samples taken include 10% field blanks or a minimum of 2 field blanks. These blanks come from the same lot as the filters used for sample collection. The field blank results will be averaged and subtracted from the analytical results before reporting. A set consists of any sample or group of samples for which an evaluation for this standard must be made.

Any samples represented by a field blank having a fiber count in excess of the detection limit of the method being used will be rejected.

5. The samples are mounted by the acetone/triacetin method or a method with an equivalent index of refraction and similar clarity.
6. The following counting rules are observed.
  - a. Count only fibers equal to or longer than 5 micrometers. Measure the length of curved fibers along the curve.
  - b. In the absence of other information, count all particles as asbestos that have a length-to-width ratio (aspect ratio) of 3:1 or greater.
  - c. Fibers lying entirely within the boundary of the Walton-Beckett graticule field will receive a count of 1. Fibers crossing the boundary once, having one end within the circle, will receive the count of one half ( 1/2). Any fiber that crosses the graticule boundary more than once is not counted, even though visible fibers are not counted if they are outside the graticule area.
  - d. Bundles of fibers are counted as one fiber unless individual fibers can be identified by observing both ends of an individual fiber.
  - e. Enough graticule fields are counted to yield 100 fibers. Count a minimum of 20 fields; stop counting at 100 fields regardless of fiber count.
7. Blind recounts will be conducted at the rate of 10 percent.

## Quality Control Procedures

### Criteria for selecting Asbestos analytical Laboratory or Performing On-site Analysis

1. Intra-laboratory program. Each laboratory and/or each company with more than one microscopist counting slides will establish a statistically designed quality assurance program involving blind recounts and comparisons between microscopists to monitor the variability of counting by each microscopist and between microscopists. In a company with more than one laboratory, the program will include all laboratories, and will also evaluate the laboratory to laboratory variability.
2. Inter-laboratory program. Each laboratory analyzing asbestos samples for compliance determination will implement an inter-laboratory quality assurance program that, as a minimum, includes participation of at least two other independent laboratories. Each laboratory will participate in round robin testing at least once every 6 months with at least all the other laboratories in its inter-laboratory quality assurance group. Each laboratory will submit slides typical of its own workload for use in this program. The round robin will be designed and results analyzed using appropriate statistical methodology.
3. All laboratories should also participate in a national sample testing scheme such as the Proficiency Analytical Testing Program (PAT), or the Asbestos Registry sponsored by the American Industrial Hygiene Association (AIHA).
4. All individuals performing asbestos analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos dust or an equivalent course.
5. When the use of different microscopes contributes to differences between counters and laboratories, the effect of the different microscope will be evaluated and the microscope will be replaced, as necessary.
6. Current results of these quality assurance programs will be posted in each laboratory to keep the microscopists informed.

## APPENDIX D ASBESTOS INFORMATION

### Substance Technical Information for Asbestos - Non-Mandatory (Appendix G to 29 CFR 1910.1001)

#### 1. Substance Identification

- a. Substance: "Asbestos" is the name of a class of magnesium silicate minerals that occur in fibrous form. Minerals that are included in this group are chrysotile, crocidolite, amosite, tremolite asbestos, anthophyllite asbestos, and actinolite asbestos.
- b. Asbestos are used in the manufacture of heat resistant clothing, automotive brake and clutch linings, and a variety of building materials including floor tiles, roofing felts, ceiling tiles, asbestos cement pipe and sheet, and fire resistant drywall. Asbestos is also present in pipe and boiler insulation materials, and in sprayed on materials located on beams, in crawlspaces, and between walls.
- c. The potential for a product containing asbestos to release breathable fibers depends on its degree of friability. Friable means that the material can be crumbled with hand pressure and is therefore likely to emit fibers. The fibrous or fluffy sprayed on materials used for fireproofing, insulation, or sound proofing are considered to be friable, and they readily release airborne fibers if disturbed. Materials such as vinyl asbestos floor tile or roofing felts are considered non-friable and generally do not emit airborne fibers unless subjected to sanding or sawing operations. Asbestos cement pipe or sheet can emit airborne fibers if the materials are cut or sawed, or if they are broken during demolition operations.
- d. Permissible exposure: Exposure to airborne asbestos fibers may not exceed 0.1 fibers per cubic centimeter of air (0.1 f/cc) averaged over the 8 hour workday.

#### 2. Health Hazard Data

- a. Asbestos can cause disabling respiratory disease and various types of cancers if the fibers are inhaled. Inhaling or ingesting fibers from contaminated clothing or skin can also result in these diseases. The symptoms of these diseases generally do not appear for 20 or more years after initial exposure.
- b. Exposure to asbestos has been shown to cause lung cancer, mesothelioma, and cancer of the stomach and colon. Mesothelioma is a rare cancer of the thin membrane lining of the chest and abdomen. Symptoms of mesothelioma include shortness of breath, pain in the walls of the chest, and/or abdominal pain.

#### 3. Respirators and Protective Clothing

- a. Respirators: You are required to wear a respirator when performing tasks that result in asbestos exposure that exceeds the permissible exposure limit (PEL) of 0.1 f/cc. These conditions can occur while your employer is in the process of installing engineering controls to reduce asbestos exposure, or where engineering controls are not feasible to reduce asbestos exposure. Air-purifying respirators equipped with a high-efficiency particulate air (HEPA) filter can be used where airborne asbestos fiber concentrations do not exceed 1.0 f/cc; otherwise, air-supplied, positive-pressure, full face piece respirators must be used.

Disposable respirators or dust masks are not permitted to be used for asbestos work. For effective protection, respirators must fit your face and head snugly. Your employer is required to conduct fit tests when you are first assigned a respirator and every 6 months thereafter. Respirators should not be loosened or removed in work situations where their use is required.



- b. **Protective Clothing:** You are required to wear protective clothing in work areas where asbestos fiber concentrations exceed the PEL of 0.1 f/cc to prevent contamination of the skin. Where protective clothing is required, your employer must provide you with clean garments. Unless you are working on a large asbestos removal or demolition project, your employer must also provide a change room and separate lockers for your street clothes and contaminated work clothes.
  - c. If you are working on a large asbestos removal or demolition project, and where it is feasible to do so, your employer must provide a clean room, shower, and decontamination room contiguous to the work area. When leaving the work area, you must remove contaminated clothing before proceeding to the shower. If the shower is not adjacent to the work area, you must vacuum your clothing before proceeding to the change room and shower. To prevent inhaling fibers in contaminated change rooms and showers, leave your respirator on until you leave the shower and enter the clean change room.
4. **Disposal Procedures and Cleanup**
- a. Wastes that are generated by processes where asbestos are present include:
    - (1) Empty asbestos shipping containers.
    - (2) Process wastes such as cuttings, trimmings, or reject material.
    - (3) Housekeeping waste from sweeping or vacuuming.
    - (4) Asbestos fireproofing or insulating material that is removed from buildings.
    - (5) Building products that contain asbestos removed during building renovation or demolition.
    - (6) Contaminated disposable protective clothing.
  - b. Empty shipping bags can be flattened under exhaust hoods and packed into airtight containers for disposal. Empty shipping drums are difficult to clean and should be sealed.
  - c. Vacuum bags or disposable paper filters should not be cleaned, but should be sprayed with a fine water mist and placed into a labeled waste container.
  - d. Process waste and housekeeping waste should be wetted with water or a mixture of water and surfactant prior to packaging in disposable containers.
  - e. Material containing asbestos that is removed from buildings must be disposed of in leak tight 6 mil thick plastic bags, plastic lined cardboard containers, or plastic lined metal containers. These wastes, which are removed while wet, should be sealed in containers before they dry out to minimize the release of asbestos fibers during handling.
5. **Access to Information**
- a. Each year, your employer is required to inform you of the information contained in this standard and appendices for asbestos. In addition, your employer must instruct you in the proper work practices for handling materials containing asbestos, and the correct use of protective equipment.
  - b. Your employer is required to determine whether you are being exposed to asbestos. You or your representative has the right to observe employee measurements and to record the results obtained. Your employer is required to inform you of your exposure, and, if you are exposed above the permissible limit, he or she is required to inform you of the actions that are being taken to reduce your exposure to within the permissible limit.
  - c. Your employer is required to keep records of your exposures and medical examinations. These exposure records must be kept for at least thirty (30) years. Medical records must be kept for the period of your employment plus thirty (30) years.
  - d. Your employer is required to release your exposure and medical records to your physician or designated representative upon your written request.

## **Definitions**

**Aggressive method** means removal or disturbance of building material by sanding, abrading, grinding or other method that breaks, crumbles, or disintegrates intact asbestos containing material (ACM).

**Amended water** means water to which surfactant (wetting agent) has been added to increase the ability of the liquid to penetrate ACM.

**Asbestos** means chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos and any of these minerals that have been chemically treated and/or altered.

**Asbestos containing material (ACM)** means any material containing more than 1% asbestos.

**Assistant Secretary** means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

**Authorized person** means any person authorized by the employer and required by work duties to be present in regulated areas.

**Class I asbestos work** means activities involving the removal of thermal system insulation (TSI) and surfacing ACM and presumed asbestos containing material (PACM).

**Class II asbestos work** means activities involving the removal of ACM which is not TSI or surfacing material. This includes, but is not limited to, the removal of asbestos containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

**Class III asbestos work** means repair and maintenance operations, where ACM, including thermal system insulation and surfacing material, is likely to be disturbed.

**Class IV asbestos work** means maintenance and custodial activities in which employees contact ACM and PACM. Activities to clean up waste and debris containing ACM and PACM.

**Building/facility owner** is the legal entity, including a lessee, which exercises control over management and record keeping functions relating to a building and/or facility in which activities covered by this standard take place.

**Certified Industrial Hygienist (CIH)** means one certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

**Clean room** means an uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

**Closely resemble** means that the major workplace conditions which have contributed to the levels of historic asbestos exposure are no more protective than conditions of the current workplace.

**Competent person** means in addition to the definition in 29 CFR 1926.32 (f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f). In addition, for Class I and Class II work one who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor, or its equivalent and, for Class III and Class IV work, who is trained in a manner consistent with EPA

requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92 (a)(2).

**Critical barrier** means one or more layers of plastic sealed over all openings into a work area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a work area from migrating to an adjacent area.

**Decontamination area** means enclosed areas adjacent and connected to regulated areas (consist of an equipment room, shower area, and clean room), used for decontamination of workers, materials, and equipment that are contaminated with asbestos.

**Demolition** means the wrecking or taking out of any load supporting structural member and any related razing, removing, or stripping of asbestos products.

**Director** means the Director, National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

**Disturbance** means contact which releases fibers from ACM or PACM or debris containing ACM or PACM. This term includes activities that disrupt the matrix of ACM or PACM, render ACM or PACM friable, or generate visible debris.

- Disturbance includes cutting away small amounts of ACM and PACM, no greater than the amount which can be contained in one standard sized glove bag or waste bag in order to access a building component.

In no event will the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or waste bag which will not exceed 60 inches in length and width.

**Employee exposure** means that exposure to airborne asbestos that would occur if the employee was not using respiratory protective equipment.

**Equipment room (change room)** means a contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

**Fiber** means a particulate form of asbestos, 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

**Filtering facepiece (dust mask)** means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

**Glove-bag** means not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

**High-efficiency particulate air (HEPA) filter** means a filter capable of trapping and retaining at least 99.97% of all mono-dispersed particles of 0.3 micrometers in diameter.

**Homogeneous area** means an area of surfacing material or thermal system insulation that is uniform in color and texture.

**Industrial hygienist** means a professional qualified by education, training, and experience to anticipate, recognize, evaluate, and develop controls for occupational health hazards.

**Intact** means that the ACM has not crumbled, been pulverized, or otherwise deteriorated so that it is no longer likely to be bound with its matrix.

**Modification** means a changed or altered procedure, material or component of a control system, which replaces a procedure, material or component of a required system. Omitting a procedure or component, or reducing or diminishing the stringency or strength of a material or component of the control system is not a “modification” for purposes of 29 CFR 1926.1101(g)(6)(ii).

**Negative Initial Exposure Assessment** means a demonstration by the employer, which complies with the criteria in 29 CFR 1926.1101(f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PELs.

**Presumed Asbestos Containing Material (PACM)** means thermal system insulation and surfacing material found in buildings constructed no later than 1980. The designation of a material as “PACM” may be rebutted pursuant to 29 CFR 1926.1101(k)(5).

**Project Designer** means a person who has successfully completed the training requirements for an abatement project designer established by 40 U.S.C. 763.90(g).

**Regulated area** means an area established by the employer to demarcate areas where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limits; also an area established by the employer to demarcate areas where Class I, II, and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos, exceed or there is a reasonable possibility they may exceed the permissible exposure limit. Requirements for regulated areas are set out in 29 CFR 1926.1101(e)(6).

**Removal** means all operations where ACM and/or PACM are taken out or stripped from structures or substrates, and includes demolition operations.

**Renovation** means the modifying of any existing structure, or portion thereof.

**Repair** means overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

**Surfacing material** means material that is sprayed, troweled on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes).

**Surfacing ACM** means surfacing material which contains more than 1% asbestos.

**Thermal system insulation (TSI)** means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.

**Thermal system insulation ACM** is TSI which contains more than 1% asbestos.

**WESTON** means WESTON Solutions Inc or subcontractors to WESTON or subcontractors for whom WESTON is responsible.